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Brompton Co. Offers to Buy Lake Sulphite

Formal Offer Made By Brompton Pulp & Paper Co. To Purchase Property of Lake Sulphite Co. Now In Liquidation — Proposal Would Provide $500,000 Cash and $500,000 of 5 Per Cent Bonds.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 8, 1941—Following approval by shareholders of the Brompton Pulp and Paper Company and of the St. Lawrence Corporation, the parent company, of negotiations for the purchase by the former of the property of the Lake Sulphite Pulp Company, Limited, in liquidation, the Brompton Company has submitted a formal offer for the property. According to reports published here, the offer is said to be in the form of $500,000 in cash, and $500,000 of 5% fourteen-year debentures of Brompton.

Negotiations of Wide Interest

These negotiations are not only of great interest to the parties involved but to the whole industry, for if they are successful they will bring into operation a magnificent new mill for the manufacture of bleached sulphite pulp at a time when added supplies of this pulp are badly needed in the American market, and this under the auspices of one of the most enterprising and reputable pulp and paper companies in the province of Quebec. The mills of the Brompton Company making the offer are situated at Bromptonville, Que. They have a capacity of 260,000 lbs. of newsprint per 24 hours and 300,000 lbs. of ground wood pulp. The mill of the Lake Sulphite Pulp Company which it seeks to buy is situated at Red Rock, amid the great timber stands of the Thunder Bay district in Ontario. Construction of this mill was started prior to the war by a syndicate headed by R. O. Sweegy, of Montreal, a well-known expert in pulp and paper matters, famous as the man who constructed the huge Beauharnois power development on the St. Lawrence river near Montreal.

Lake Sulphite Started During Depression

Undertaken during the depression, the work of constructing the Lake Sulphite Company's mill at Red Rock ran into financial difficulty when the work was far advanced and ultimately the property went into receivership, construction being suspended. As planned, the mill has a capacity for the production of 540,000 lbs. per 24 hours of bleached sulphite pulp, cellulose for rayon, and other cellulose products and refined sulphite screenings.

Injuries in Paper Industry Decrease

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., November 24, 1941—An interesting totalization of industrial injuries reported in the paper and allied products industry in Illinois in September has just been issued by the Illinois Department of Labor. There were 123 injuries reported during the month, 35 due to handling objects, 12 to falls, 43 to machinery, 3 to vehicles, 9 to striking against objects, 9 to falling objects, 6 to hand tools, 1 to hot substance such as flame and 5 to other causes. There were no fatal injuries suffered.

The same survey points out that employment in the paper goods, printing and publishing industry in Chicago is 6.6 per cent down in September as compared to August while payrolls over the same comparative period are down 6.1 per cent. Later Illinois figures show the industry increasing employment in Illinois in October over September by 4½ per cent and payrolls by 6.6 per cent. Over all, more than 300,000 additional persons were employed in October, 1941, as compared to October, 1940.

Announces Newsprint Prices

MONTREAL, Que., Canada, December 8, 1941—International Paper Sales Company, Inc. has advised its customers that for the period April 1 through June 30, 1942, its standard contract prices for newsprint will be $3 a ton above the prices now prevailing under its contracts.

While the cost of manufacturing newsprint has materially increased particularly since the outbreak of war, International's present prices, now firm through March of next year, will have been in effect for over four years, or since January 1, 1938.

The company believes this record should give assurance that the present price adjustment is equally conservative and made essential by today's conditions.

Gilbert Co. Shipping More Paper to China

Lend-Lease Purchases of Currency Paper Now Twenty Tons Weekly — Future Fourdrinier Wire Shortage Averted — Hourly Earnings In Wisconsin Mills At Peak — Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 8, 1941—Placed high on the priority list, the Gilbert Paper Company, Menasha, Wis., is shipping twenty tons of its highest quality rag paper per week to the Chinese government. Purchases are being made under the Lend-Lease Act through the Universal Trading Company of New York City.

China's demands grow out of its use of currency entirely because all coins have been withdrawn from circulation to prevent the copper and silver from falling into the hands of the Japanese. Its printings of paper money therefore are heavy, because bills are even as low in denomination as one cent. Part of the currency is engraved in this country, and the remainder in hidden plants in the interior of China.

Gilbert Company has been supplying paper for China's currency since 1922, when the lowest denomination was one dollar. Last year the mill delivered 300 tons. In addition to this year's standing order of twenty tons per week, the Gilbert company received an order for 1,900 tons to be shipped as soon as possible. Since the mill was already swamped, the order was turned over to other mills.

Speed Up Lend-Lease Shipments

Since the shipments are being made under the lend-lease program, the United States Government has done everything possible to speed up deliveries. Some governmental agencies, including the government printing office, are way below the Chinese on the priority list and are obliged to wait for deliveries until China's quota have been filled. Only the American army, navy and a few other departments have priority over China.

Next year mills in the rag content field have been ordered to set aside 33 per cent of their tonnage to meet additional Chinese demands.

Fourdrinier Wire Shortage Averted

Manufacturers of Fourdrinier wires have been notified that an exemption from the "copper wire regulation" has been issued by Donald Nelson, director of the Supplies, Priorities and Allocation Board in Washington, D. C. Possible shortages of wire has thus been averted so paper mills will not be hampered in their production for governmental and defense needs.

The exemption order specifies that copper may be obtained "for repair or replacement purposes in plants employing chemical processes." No effort has been made to insure an adequate supply of wire even though priority has been granted on purchases. Manufacturers of Fourdrinier wire are still required to curtail production to a percentage of their 1940 output.

Should paper mills find it difficult to obtain sufficient quantities, defense officials explain, the product may be allocated to companies in specific instances. In case of wire shortage, manufacturers are requested to apply to the pulp and paper branch of the Office of Production Management in Washington.

Hourly Earnings Reach Peak

Hourly earnings in the paper mills of Wisconsin have reached a peak average of 71.1 cents, according to compilations of the Wisconsin Industrial Commission for the month of October, 1941. September reports showed they had passed the 70-cent mark, and recent increases generally on the basis of three cents per hour have upped the payrolls to a new high. The average pay check is $31.33 per week for 44.1 hours.

While employment is just about holding its own, weekly payrolls were up 6.4%, from $711,000 in September to $756,000 in October. They have reached a gain of 28.9% over October, 1939, when the total outlay was $587,000 weekly.

The estimated number of wage earners showed a slight tapering off from October, down 0.1% from September. Total numbers of workers was 24,100 in October and 24,200 in September. This is still 9.9% above October, 1941.

Converting and specialty plants of the Milwaukee metropolitan area are somewhat below the scale of the mills throughout the state, since the average hourly earnings are reported at 66.9 cents, or $28.82 per week for 43.1 hours. Nineteen plants reporting showed a slump of 0.3% in number of workers for October as compared to September. Total number on the October payrolls was 2,214. Payrolls were $63,805 per week for October, up 3.3% from September.

Nekoosa-Edwards Celebrating Anniversary

The Nekoosa-Edwards Paper Company, Port Edwards and Nekoosa, Wis., is celebrating its seventy-fifth anniversary this year, it was revealed during the quarterly tri-state labor conference at Nekoosa, Sunday, November 30.

John E. Alexander, president and general manager, recounted this fact when he spoke at the closing banquet, attended by 175 delegates representing 85 paper workers' locals in Wisconsin, Michigan and Minnesota. He recounted the history of the region and the development of the paper industry as the outgrowth of the natural resources of power and raw material available. Nepco, he said, has grown in its diamond jubilee to an enterprise with approximately 1,500 employees. Papermaking and converting give direct employment to 25,000 workers in Wisconsin, the speaker said, and upwards of 125,000 others receive indirect employment. The extent to which this depends upon pulp wood used dictates a policy of conservation, Mr. Alexander said. He added in conclusion that industrial relationships between the company and its union employees had developed along "most successful and harmonious lines."

Rasmus Anderson of Green Bay, Wis., toastmaster at the banquet, characterized union relationships with Nekoosa-Edwards company are "second to none" in the Tri-State area.

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Ray Richards of Wisconsin Rapids, Wis., international vice-president of the Pulp and Sulphite Union, also was a banquet speaker. He asserted that it is incumbent upon unions "not to abuse the power that has been given us. We must remember not to abuse our rights." He admonished sound leadership without "racketeering."

Peshtigo, Wis. was selected as the place for the next Tri-State meeting, the date to be fixed later.

Neenah Employees Plan Party

Employees of the Neenah Paper Company, Neenah, Wis., will hold their annual Christmas party Sunday, December 21. Children of the workers will be entertained in the afternoon at the auditorium of the city hall. A dinner will be held at 6 o'clock in the evening at Valley Inn, with an anticipated attendance of 300. Lieutenant-Colonel Dan A. Hardt of the sales department, who is now on active duty at Camp Livingston, La., will be the toastmaster. He will be home for the Christmas holidays. Melvin Redlin is general chairman of the arrangements committee.

Gerbrick-Strange Engagement

The engagement has been announced of William J. Gerbrick of the Central Paper Company, Menasha, Wis., and Miss Jane Claire Strange, daughter of Mr. and Mrs. A. T. Strange of Menasha. Mr. Gerbrick's father, W. K. Gerbrick, is general manager of the Central company. No date has been set for the wedding.

Frank J. Marshall Dead

Frank J. Marshall, 78, died on November 29, in Easton, Pa., of a heart attack, while visiting his son there. He was born May 30, 1863 at Fitchburg, Mass., the son of James F. and Winifred Marshall. He was the last of his family, and of four generations of paper makers, all well known in their day. Much of his early life was spent in the South, and later at Turners Falls, Mass., where he learned the trade of papermaking. After completing his work in Turners Falls, he occupied executive positions in the West and South.

While still a young man he invented the Marshall Perfecting Engine, and founded the Marshall Engine Company of which he was sole owner. This machine was used in the leading paper mills of this Country and Europe, also in India and Japan. Mr. Marshall had a wide acquaintance in the paper trade, and frequently entertained friends from foreign countries. He traveled widely in the interest of his business, in the United States, Mexico, Canada and Europe, having crossed the ocean 24 times. In 1891 he married Miss Lucy G. Howard, daughter of Mr. and Mrs. George Howard, of Turners Falls, Mrs. Marshall died in 1938.

Surviving are four children, Mrs. Elwood S. Brinker of Newark, N. J., Mrs. Myron Cutler of Springfield, Mass., Frank T. Marshall of Easton, Pa., and Robert A. Marshall of Newark.

Funeral services were held at the McCarthy Funeral Home, in Greenfield, Mass., on December 3, with the Rev. Herbert Morell of the First Congregational Church of Turners Falls, officiating. Interment was in the family lot in the Springdale Cemetery at Turners Falls.

No Newsprint Advance in Canada

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 8, 1941—Following the announcement of the International Paper Sales Company, Inc., subsidiary of the International Paper Company, that its standard contract price for newsprint will be $53 per ton, delivered at New York, for the second quarter of 1942, it has been officially stated at Ottawa that in Canada the price will not be allowed to rise.

Donald Gordon, chairman of the War Time Prices and Trade Board, who made this statement, said: "I assume the announcement of International Paper Sales in Montreal that the price of newsprint will be raised from $50 a ton to $53 refers to the export price, on which there is no restriction. Under the maximum prices regulations the price of newsprint for consumption in Canada will not be allowed to increase."

The price ceiling regulations in Canada went into effect on December 1st. They apply to virtually all goods and many services provided in Canada, but export prices have been left outside the regulations and may fluctuate normally. It is expected here that Canadian companies generally will follow the example of the International Paper Company, that having been the practice for some years past.

Roy Campbell, of Montreal, secretary of International Paper Sales, Inc., in announcing the increase of $3 per ton for the period April 1 to June 30, 1942, said: "While the cost of manufacturing newsprint has materially increased, particularly since the outbreak of war, International has followed a conservative policy in respect to price. The present price adjustment is equally conservative and made essential by today's conditions."

Paper Men Plan Holiday Party

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 8, 1941—With elaborate preparations under way for its annual Christmas Party to needy children, members of the Philadelphia Paper and Cordage Association, Inc. are devoting much of their time to entertaining seventy-five underprivileged boys and girls from the Settlement House of the Salvation Army on Tuesday, December 16th, at 12:30. The ballroom of the Adelphia Hotel on that date will be a gala scene with old and young alike indulging in the festivities of the occasion. On Monday evening preceding, John J. Shinners, Jr., of Acme Specialty Company, president of the Association, Harry J. Smith of Thomas W. Price Co., vice-president, Everett Hoffman of J. E. Fricke Co., treasurer, Richard H. Gifford of M. H. Gifford Manufacturing Company, secretary, and W. R. Peterson of E. J. Spangler Envelope Company, chairman of the entertainment committee, with the aid of the Ladies' Auxiliary will decorate the hall.

Garrett-Buchanan Open Branch

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 8, 1941—Garrett-Buchanan Company, 12 South 6th street, announces the opening of offices and warehouse at 526-538 N. Charlotte street, Lancaster, Pa., on Monday, December 15. William T. Price will be manager, and LeRoy Killian will have charge of the wrapping paper department.

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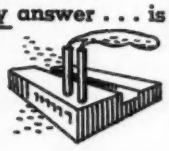

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May Sell Abitibi Co. Without Reserve Bid

Court Grants Application of Montreal Trust Co. To Finally Dispose of Property and Assets of Abitibi Pulp & Paper Co. — Appeal To Higher Court May Be Made and Legal Battle Is Predicted.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 8, 1941—Another round in the legal battle for the final disposition of the assets, property and undertakings of the Abitibi Pulp and Paper Company, Ltd., ended Thursday, when Mr. Justice Middleton, in a judgment delivered at Osgoode Hall, granted the application of the Montreal Trust Company, Canadian trustees, to sell without reserve bid. In giving his judgment his lordship stated that the order could go as sought and that "terms might be spoken to".

After reviewing the legislation and referring to the Ontario Moratorium Act, which purported to prevent a sale until December 31, 1942, Mr. Justice Middleton said the latter was ultra vires the Ontario legislature.

"The act," he says, "does not in itself go beyond fixing a date at which its operation is to terminate—Dec. 31, 1942—and it is impossible for the attorney-general to state the intention of the legislature in so providing. That is like a provision contained in the other moratorium acts, and it may well be followed by provisions in the acts passed by the legislature in the year 1942 and subsequent years, continuing its operation.

"Upon this motion the validity of the act is challenged.

"In the litigation recited is the winding-up order. This was made under an act of the Dominion relating to matters in question. It is in that act provided that there should be no proceedings by a secured creditor save as permitted by the court. Pursuant to this act leave was obtained by the Montreal Trust Company to proceed under its mortgage, and a direction was given as to the mode of procedure, to wit, it was stated by implication that it was to be in accordance with the orders and rules of practice that were in existence at the date of the application.

Comments on Application for Sale

"The application was made by the Montreal Trust Company. It sought to invoke the powers of the court to appoint a receiver and manager for the purpose contemplated, to wit, the operation and management of the company and its foreclosure under the terms of the bond mortgage. These terms require it to operate, not only in the province, but as well in the sister provinces of Quebec and Manitoba. In this province operations of the company were carried on."

His lordship stated that he thought it impossible to suppose that the company operating under a Dominion act is "limited in any way by the terms that might be imposed by the legislature of the province not contained in the act."

"It follows", continued Mr. Justice Middleton, "from this that the legislation passed subsequently by the province did not operate to restrict the leave granted by the Dominion act, and that, therefore, the act was, as I have said, ultra vires, insofar as it seeks to control the powers of the court."

In making the order to sell without reserve bid, his lordship said, "the applicants may add their costs to their claims."

Refers to Report of Royal Commission

In the opening portion of his judgment, Mr. Justice Middleton refers to the proceedings of the Royal commission appointed to investigate the affairs of Abitibi. No proceedings, legislative or otherwise, had been taken to give effect to the findings of the commissioners or their recommendations, and the question argued was the right of the bandholders of the company in question to proceed with the sale.

"This right," he said, "depends upon the construction of the act (5, Geo. VI, C-1) by virtue of which it is contended that the power to proceed with the litigation is at an end.

A Question Raised

A question raised on the street was whether the bondholders' committee, now that they have won the first court decision, would be willing to call all parties together. Reasons put forward for this suggestion include the fact that legal battles are so costly and much could be saved by avoiding further litigation; the long delay that such further legal actions would entail and existing conditions that call for co-operation rather than litigation.

Appeal to Higher Court May Result

Opinion was expressed that an appeal to a higher court will be made against the decision of Mr. Justice Middleton. An appeal could be made by the defendants, who are represented by the liquidator and who are among those who seek preservation of an equity in the company, before the court of appeals of Ontario. An appeal to a higher court could be made in behalf of the Province of Ontario in relation to that government's Abitibi Moratorium Act. It is stated also that the liquidator might take the case to a higher court, with the department of the attorney-general acting in a supplementary capacity.

Predictions that an extended legal fight would take place in connection with the Abitibi case are based on the belief that there are several courses available. First, an appeal could be made to the Ontario court of appeals, then to the supreme court at Ottawa, and finally to the privy council London.

John P. Burke Speaks at Fulton

[FROM OUR REGULAR CORRESPONDENT]

FULTON, N. Y., December 8, 1941—A meeting of the Oswego Falls branch of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers was held here last week at which several organization leaders addressed the members. Speeches were given by John P. Burke, vice president and secretary of the International body, Jacob Stephan, organizer of the union, and Mr. Bernell, of Ontario, Canada, second vice president of the organization. The speakers discussed union activities and aims besides the local situation. Seward Small, president of the union, was in charge of the meeting and presented the speakers.

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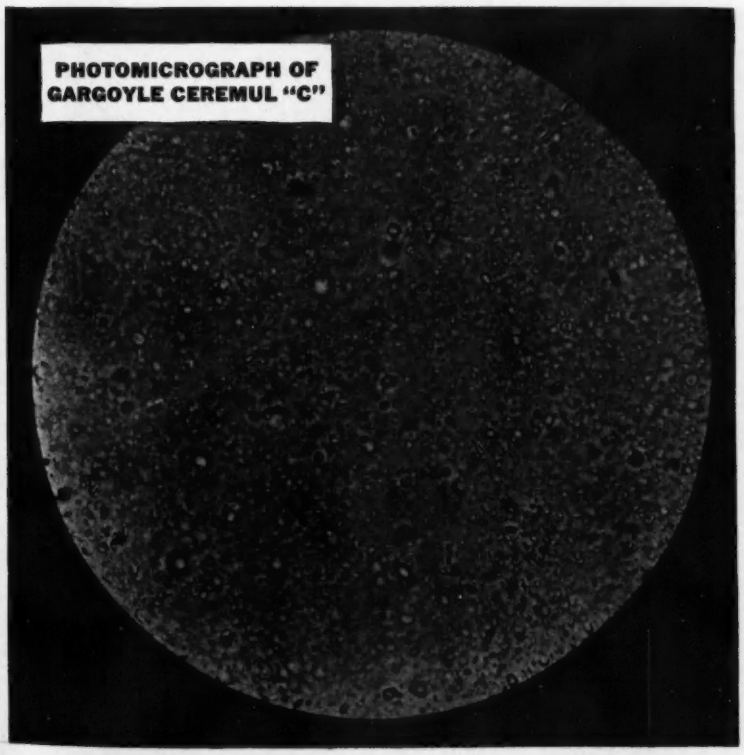

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CONSTRUCTION NEWS

Belleville, N. J.—The American Tag Company, 113 Sussex avenue, Newark, N. J., manufacturer of shipping tags, labels and other paper specialties, has awarded general contract to Oscar A. Peterson Construction Company, 78 North Willow street, Montclair, N. J., for modernization and improvements in one and two-story industrial building at Rutgers and Courtland streets, Belleville, comprising former mill of the Overman Cushion Tire Company, acquired by first noted company several months ago. Property totals about 35,000 square feet of floor space, with total site approximating 2½ acres of land, and will be used by American company for new converting plant. Construction program will provide for additional floor space, in conjunction with alterations, and is estimated to cost close to $50,000. Equipment installation will provide for large capacity. Maintenance Engineering Company, 59 Willet street, Bloomfield, N. J., is architect and engineer. Company also has arranged for lease of a one-story industrial building on Passaic street, Newark, owned by Tomkins Brothers, and will occupy for storage and distributing service. It is proposed to take over the structure at once. Main offices of company are at 6153 South State street, Chicago, Ill.

Kalamazoo, Mich. — The Western Board and Paper Company has been organized with capital of $500,000 by Leon and William Slavin, officials of the Michigan Paper Stock Company, Kalamazoo, to take over and operate the former local mill of the Detroit Paper Products Corporation, King highway, acquired a few months ago, for a reported consideration of about $300,000. Work has been under way for remodeling and modernization of property, as previously noted in these columns, including installation of considerable machinery and equipment for the production of box board, to provide for a capacity of about 135 tons per day. Work is scheduled for completion early in January, when mill is scheduled to be placed in service, with facilities for employment of about 165 persons. Approximately $125,000 has been expended in the program noted. The plant has been idle for about 10 years.

Cleveland, Ohio — The Sobel Corrugated & Wooden Box Company, 2828 Clinton avenue, manufacturer of corrugated boxes and containers, and other box specialties, is considering early rebuilding of portion of plant, recently destroyed by fire with loss reported at close to $45,000, including equipment.

Lufkin, Tex.—The Southland Paper Mills, Inc., Lufkin, manufacturer of newsprint, has plans maturing for new additions to mill, consisting of several one and multi-story units, to be equipped to double present capacity of about 50,000 tons per annum, giving the plant a rating of 100,000 tons a year. Installation will include a new chemical pulp unit, newsprint machine and accessories, with storage and distributing structures and auxiliary facilities. Cost is estimated at close to $2,100,000, and financing has been completed for a total fund in excess of that figure, through R.F.C. loan of $1,500,000 and authorized stock issue of $900,000. Project will be carried out during 1942. It is understood that George A. Hardy, 305 Broadway, New York, is consulting engineer for project.

Long Island City, New York, N. Y.—The Arvey Corporation, 3462 North Kimball avenue, Chicago, Ill., manufacturer of cutouts and other paper specialties, boxes, etc., has leased a one-story industrial building at 35-50 Tenth street, Long Island City, and will occupy for new factory branch, storage and distributing plant.

New York, N. Y.—The Plymouth Corrugated Paper Products Corporation, recently organized with capital of $20,000, plans operation of local plant for manufacture of corrugated paper boxes and containers, and kindred paper specialties. New company is represented by Nathaniel Levine, 570 Seventh avenue, an attorney.

Millington, N. J.—Asbestos, Limited, 8 West 40th street, New York, N. Y., manufacturer of asbestos board products, has approved plans for new addition to plant on Division avenue, Millington, consisting of a one and two-story building, about 100 x 180 feet, reported to cost over $85,000, including equipment. It will provide for large increase in present capacity. Bids have been asked on general erection contract, with low estimate submitted by Schurman Construction Corporation, 782 Paterson Avenue, East Rutherford, N. J., at $44,850 for building erection. Award is scheduled to be made soon.

Kaukauna, Wis.—The Sangamon Paper Mills, Inc., has plans nearing completion for new addition, to be one-story, about 48 x 60 feet, reported to cost over $25,000, with equipment. Erection is scheduled to begin soon.

Chicago, Ill.—The Central Paper Stock Company, 1215-65 West North avenue, commercial paper products, is considering rebuilding of portion of storage and distributing plant at location noted, recently destroyed by fire, with loss reported close to $75,000, including building, equipment and stock.

Norfolk, Va. — The Gordon-Lavin Paper Box Company, Inc., 118 North Paca street, Baltimore, Md., manufacturer of folding paper boxes and containers, has leased the Bosman-Lohman Building, Twenty-third and Granby streets, Norfolk, and will occupy for factory branch, storage and distributing plant. Company is represented in Norfolk district by Meyer Glazer, with present branch at 204 West Water street, who has carried out all arrangements and leasing of new quarters for early occupancy.

Lockport, La.—Valentine Sugars, Inc., is said to have perfected plans for a new department at mill for the production of materials from bagasse. The new material, it is stated, will be of plastic character, with large output now planned to be ready for market at early date.

Menasha, Wis. — The Gilbert Paper Company, manufacturer of bond, ledger and other writing paper stocks, is completing the erection of a new addition to mill, previously referred to in these columns, and will have the structure ready for occupancy at early

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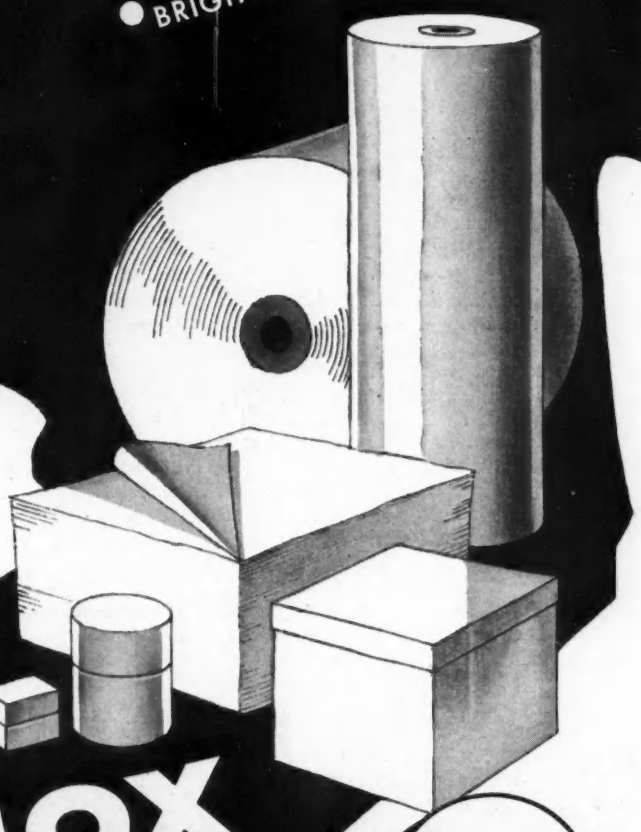

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date. It will be one-story and basement, designed for storage and distributing service, and is reported to cost about $35,000, including equipment. Miscellaneous contracts have been let for plumbing, sheet metal work, etc. General erection contract has been carried out by C. R. Meyer & Son Company, 50 State street, Oshkosh, Wis.

Roanoke, Va.—The American Viscose Corporation, Roanoke, Va., manufacturer of viscose rayon products, has taken out a permit for expansion in local mill, including new processing unit and installation of machinery for that purpose. Cost reported close to $50,000, with equipment. Main offices are at Marcus Hook, Pa.

New York, N. Y.—The Globe Cardboard Novelty Company, a new concern in city, has arranged for lease of space in building at 547-49 Greenwich street, and will occupy for new paperboard converting plant.

Montreal, Que.—Allied Roofing Products, Ltd., recently organized, represented by John A. Nolan, 620 Cathcart street, attorney, plans new local plant for manufacture of prepared roofing specialties, roofing papers, etc., reported to cost close to $50,000, including equipment.

Kalamazoo, Mich.—The Illinois Envelope Company, 400 Bryant avenue, manufacturer of commercial envelopes and kindred paper stocks, has work in progress on new one-story addition to converting plant, to provide for considerable increased capacity. As recently noted in these columns, company also will make alterations and improvements in present building. Entire project is reported to cost close to $25,000, including equipment. Henry L. Vander Horst, Inc., 106 Thompson street, Kalamazoo, has general contract for the work. Stewart-Kingscott Company, Kalamazoo, is architect.

Milwaukee, Wis.—The Johnson Box Company, 714 East Keefe avenue, manufacturer of corrugated boxes and containers, a division of the Inland Container Corporation, has begun erection of two-story addition to plant, about 30 x 48 feet, recently noted in these columns, and will push work to early completion. It will be used for general operating service, including offices. Company also will build a new loading platform at plant, about 12 x 250 feet, and will make other improvements. The Hunzinger Construction Company, Butler, Wis., has the general contract. Leigh Hunt, 152 West Wisconsin avenue, Milwaukee, is architect.

New Companies

Green Bay, Wis.—The Paper Products Corporation has been organized to manufacture and deal in paper goods of various kinds. New company is headed by F. O. Walker, Clarence M. Stengel and S. B. Schwartz, all of Green Bay.

New York, N. Y.—G. O. S. Manufacturing Corporation has been chartered to manufacture and deal in felt products, and allied specialties. New company is represented by Alfred Prager, 55 West Forty-second street, attorney.

New York, N. Y.—Papyrus Papeteries, Inc., 200 Fifth avenue, paper specialties, has leased space in building at 3 West Nineteenth street, and will occupy for storage, distribution and other operating service.

New York, N. Y.—The Pioneer Container Corporation has been chartered with capital of 200 shares of stock, no par value, to manufacture and deal in corrugated paper boxes and containers and allied products. New company is represented by Morris Fried, 260 Broadway, Brooklyn, attorney.

Brooklyn, N. Y.—The Sterling Carton Corporation has been incorporated with capital of $20,000, to manufacture and deal in paper boxes and containers, corrugated paper specialties, etc. New company is represented by Robbins, Stationer, 25 Warren street, New York.

Stamford, Conn.—The Colonial Paper Bag Company, Stamford, has filed notice of organization to manufacture and deal in paper bags and containers of various kinds. Edwin D. Foster, 24 Kirkam place, Glenbrook, Conn., is head.

OPA Issues Rag Prices

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 10, 1941—Ceiling prices below prevailing levels are established for old rags, basic raw material in the manufacture of roofing, linoleum and certain grades of paper, in Price Schedule No. 47 issued today by Leon Henderson, Administrator, Office of Price Administration.

Maximum prices established in the schedule cover between 80% and 90% of the various grades of old rags. In the case of No. 2 roofing rags, a base grade, the schedule sets a top price of $29.00 a ton for carload lots, f.o.b. point of shipment, compared with current market quotations of $34.00 to $35.00 a ton. The usual differential of $2.00 a ton above and below the base grade is applied to prices of various other grades of roofing rags.

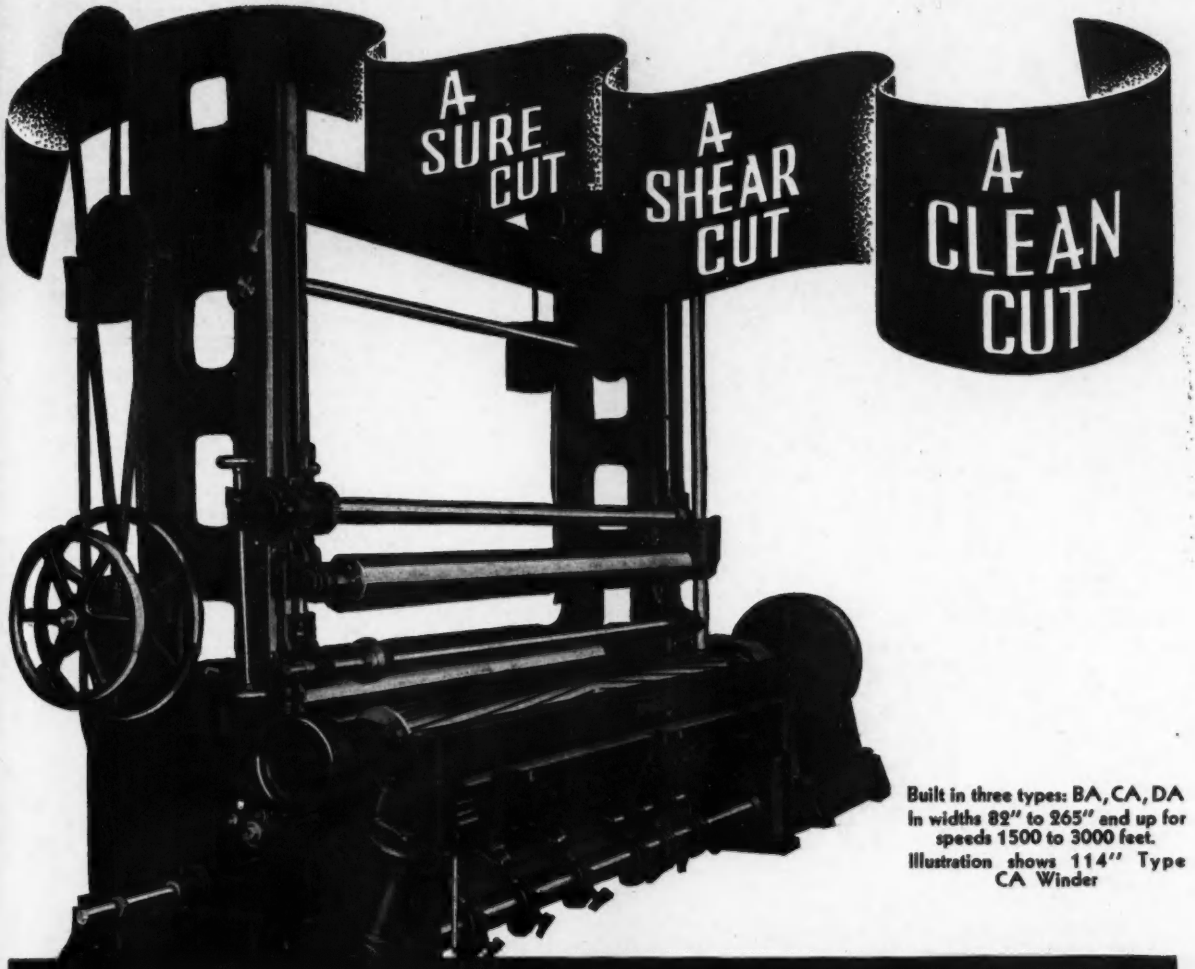
Ten grades of old rags used to make certain grades of paper are assigned maximum prices in the schedule, ranging from $29.00 a ton to $76.00 a ton for carload lots, f.o.b. point of shipment.

Prices for less-than-carload lots in all cases must not exceed the established prices less 4%. Unless completed within seven days, delivery of a carload lot by a series of truck shipments cannot command the carload lot prices established in the schedule.

Allowances are provided for brokers in old rags. Such an allowance, it is stipulated, may not exceed the lesser of the following: (1) The regular allowance customarily charged during the 12 months ended October 1, 1941, or (2) $1.00 a ton on grades selling at $31.00 a ton; $1.50 a ton on grades selling between $31.01 and $53.00 a ton; and $2.00 a ton on grades selling between 53.01 and $76.00 a ton. A "broker" is defined in the schedule as a person who has been engaged in the business of brokering or jobbing of rags between October 1, 1940, and October 1, 1941.

The schedule lists a number of requirements which must be fulfilled in order that a person may be entitled to receive a brokerage allowance. These provisions should be carefully studied, Mr. Henderson said, since OPA will insist upon their strict observance.

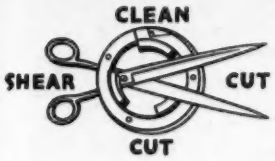
"New cuttings", i.e., cotton scraps accumulated in garment factories, etc., are not covered by the old rags schedule. However, it was stated, the prices of these cuttings, which are used exclusively by paper mills, are being watched closely. If any inflationary price tendencies develop, OPA will move promptly to establish a ceiling, Mr. Henderson said.



Built in three types: BA, CA, DA
In widths 82" to 265" and up for speeds 1500 to 3000 feet.
Illustration shows 114" Type CA Winder

LANGSTON

Slitters & Roll Winders



THIS IS ONE of five sizes and types designed to meet every requirement in the mill, finishing room or paper converting plant.

Langston's heavy construction and balancing of drums and idlers prevents vibration. Bearings, gears, and all parts are proportioned to assure maximum service. Learn more about the all-around efficiency of Langston Slitters and Roll Winders. We are at your service.

SAMUEL M. LANGSTON COMPANY, Camden, N. J.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending December 10, 1941

	High	Low	Last
A. P. W.	1	⅜	⅜
Armstrong Cork Co.	25⅞	22¾	23½
Celotex Corp.	7⅜	5⅜	6⅛
Celotex Corp., pf.	68	66½	66½
Certain-Teed Products Corp.	2⅜	1½	1⅝
Certain-Teed Products Corp., pf.	31	22½	25
Champion Paper & Fibre Co.	17⅜	15½	15½
Champion Paper & Fibre Co., pf.	100	95½	95½
Congoleum-Nairn Co.	15½	14	14⅜
Container Corp. of America	13¾	11	11½
Continental-Diamond Fibre Co.	8	7¼	7¼
Crown-Zellerbach Co.	12⅛	10	11
Crown-Zellerbach Co., pf.	88	80	81
Flintkote Co.	11¾	9⅛	9½
Robert Gair	2¼	1⅜	1¾
Robert Gair, pf.	11	10	10⅛
International Paper Co.	16½	11½	13½
International Paper Co., pf.	59	51¼	54½
Johns-Manville Corp.	59¾	51½	52⅜
Johns-Manville Corp., pf.	....	....	....
Kimberly Clark Corp.	30½	26½	26½
MacAndrews & Forbes	21⅜	19	19
MacAndrews & Forbes, pf.	135	135	135
Masonite Corp.	26¼	22¾	23
Mead Corp.	7	5	6
Mead Corp., pf.	71	71	71
Paraffine Companies, Inc.	25⅝	19½	20½
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	11⅛	8¾	10
Rayonier, Inc., pf.	26	24	25
Ruberoid Co.	19⅛	16	16½
Scott Paper Co.	37½	31¾	31¾
Scott Paper Co., pf.	114½	113½	113½
Sutherland Paper Co.	17¾	16¼	17
Union Bag & Paper Corp.	9½	7	7¼
United Paperboard Co.	3⅜	2⅛	3
U. S. Gypsum Co.	48½	42¼	42¾
U. S. Gypsum Co., pf.	176	175½	175½
West Virginia Pulp & Paper Co.	18	15	15¾

New York Curb Exchange

High, Low and Last for Week Ending December 10, 1941

	High	Low	Last
American Box Board Co.	4½	3¾	3¾
Brown Co., pf.	....	....	....
Great Northern Paper Co.	33	29½	30
Hummel-Ross Fibre Corp.	5½	4½	4⅝
National Container Corp.	10	8⅝	8⅞
St. Regis Paper Co.	1⅜	1¼	1½
St. Regis Paper Co., pf.	116	105	105
Taggart Corp.	2¼	1¾	1¾

Donnacona Co. Calls Special Meeting

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 8, 1941 — A special meeting of the shareholders of the Donnacona Paper Company has been called, to be held in Quebec on Dec. 16, to consider a by-law abolishing division of the company's capital stock into class "A" and "B" shares as of Dec. 31, 1941. The capital stock, as from that date, will be converted and merged into one class of stock to be known as no par value common.

The amount of capital with which the company will carry on business will not be changed—$2,107,860 compared with 376,572 common shares. Each share will be entitled to one vote.

United Paperboard Votes Dividend

The United Paperboard Co. has declared a dividend of $3 on the non-cumulative preferred, entitled to $6 annual dividends before payments can be made on the common shares. The dividend is payable December 17 to stock of record December 10. The company also declared a dividend of $1.60 on that preferred stock as the balance of earnings for the fiscal year ended May 31, 1941. The latter dividend is payable December 17 to stock of record December 10.

Int. Paper Co. Stock Listed

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 8, 1941—The Montreal Stock Exchange has approved for listing on the Exchange the capital stock of the International Paper Company here, as from today (December 8).

The listing covers 929,793 shares of cumulative convertible 5% preferred stock of $100 par value, 1,827,789 shares of common stock of $15 per share par value and common stock purchase warrants to purchase 1,347,748 shares of common stock of $15 par value, with authority to add 3,712,231 shares of common stock of $15 per share par value upon official notice of issuance.

International Paper Company was organized under the laws of the State of New York on June 23, 1941, as the successor of International Paper and Power Company and the old International Paper Company. A reorganization agreement was approved by the shareholders of International Paper and Power Company at a meeting held September 25, 1941.

A. P. W. Profits Up

The A. P. W. Paper Company, for the period, July 1, 1941 to October 18 reports a net profit of $27,298 after depreciation, Federal income taxes, interest on funded debt and other charges including accrued interest for period on twenty-five year 6% convertible notes. In similar period of preceding fiscal year, net loss was $16,507 when no provision was made for non-cumulative interest on the $761,706 par value of 6% convertible notes assented. Report states that no provision was made in current accounts for additional contingent interest of 1% on first mortgage bonds with warrants, nor for Federal excess profits taxes since no liability exists therefore as of October 18.

St. Helens Nets $1.88

The St. Helens Pulp and Paper Company for the ten months to October 31, reports a net profit of $376,791, equal to $1.88 each on 199,934 common shares, against $414,059, or $2.07 a common share, reported for full year of 1940. Net sales for respective periods were $3,709,844 and $3,452,291.

Ruberoid Votes $1.25 Dividend

The Ruberoid Company has declared a year-end dividend of $1.25 a share on the common stock, payable December 19 to stock of record December 4. Previous payment was 50 cents a share made on June 27, 1941.

To Build Tissue Mill at Berlin

A press dispatch states that ground has already been broken at Berlin, N. H., for a two machine tissue mill to be erected by Personal Products Corporation, a division of Johnson & Johnson, medical supply manufacturers.

Printing Committee Makes Paper Awards

Successful Bidders Are Announced For Supplying the Government Printing Office For the Period of Three Months, Beginning January 1, 1941—Awards Are For 60 Per Cent of Original Bids.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 3, 1941—The Joint Congressional Committee on Printing announced awards today for paper for the use of the Government Printing Office for the three months period beginning January 1. The awards are for the bids received on November 24 and are only for 60 per cent of the amount for which the Printing Office had originally asked bids. The awards announced include the following:

No. 1. National Pulp and Paper Company, 2.90 cents. (330,000 pounds)
Paper Corp. of U. S., 3.53 cents (1,470,000 pounds)

No. 3. Barton, Duer & Koch Paper Company, 7.60 cents.

No. 4. Frank Parsons Paper Company, 6.75 cents.

No. 5. Marquette Paper Company, 6.75 cents.

No. 6. Mudge Paper Company, 7.11 cents.

No. 7. Northwest Paper Company, 7.26 cents.

No. 8. Frank Parsons Paper Company, 6.40 cents.

No. 9. Northwest Paper Company, 7.26 cents.

No. 10. Frank Parsons Paper Company, 6.10 cents.

No. 11. Mudge Paper Company, 7.19 cents.

No. 12. Stanford Paper Company, 6.90 cents. (300,000 pounds)
Mead Sales Company, 6.94 cents. (300,000 pounds)

No. 13. Barton, Duer & Koch Paper Company, 7.23 cents.

No. 14. No bids.

No. 18. Mudge Paper Company, 7.80 cents.

No. 20. Marquette Paper Company, 8.58 cents. (600,000 pounds)

No. 21. Mudge Paper Company, 7.65 cents.

No. 22. Paper Corp. of U. S., 7.18 cents.

No. 23. Graham Paper Company, 9.18 cents.

No. 24. Old Dominion Paper Company, 17.47 cents.

No. 26. Whitaker Paper Company, 12.41 cents.

No. 27. Whitaker Paper Company, 12.41 cents.

No. 28. Whitaker Paper Company, 12.41 cents.

No. 29. Barton, Duer & Koch Paper Company, 13.95 cents.

No. 31. Barton, Duer & Koch Paper Company, 20.00 cents.

No. 32. Barton, Duer & Koch Paper Company, 18.00 cents.

No. 34. Frank Parsons Paper Company, 6.75 cents.

No. 35. R. P. Andrews Paper Company, 7.30 cents.

No. 36. Marquette Paper Company, 6.40 cents.

No. 37. R. P. Andrews Paper Company, 6.80 cents.

No. 38. R. P. Andrews Paper Company, 6.80 cents.

No. 39. Mead Sales Company, 7.272 cents. (400,000 pounds)

No. 41. Whitaker Paper Company, 8.85 cents. (600,000 pounds)
Paper Corp. of U. S., 8.88 cents. (330,000 pounds)
Butler Company, 8.88 cents. (110,000 pounds)
Stanford Paper Company, 8.93 cents. (460,000 pounds)

No. 42. Dill & Collins, Inc., 14.78 cents.

No. 43. Whitaker Paper Company, 12.68 cents.

No. 44. Whitaker Paper Company, 6.94 cents.

No. 45. Barton, Duer & Koch Paper Company, 6.92 cents. (200,000 pounds)
Northwest Paper Company, 7.03 cents. (160,000 pounds)

No. 46. Cauthorne Paper Company, Inc., 8.20 cents.

No. 48. Old Dominion Paper Company, 9.995 cents. (1,000,000 pounds)
Aetna Paper Company, 10.12 cents. (Remainder)

No. 49. Old Dominion Paper Company, 9.64 cents. (300,000 pounds plus 10% overrun)
Bradner Smith & Company, 10.02 cents. (40,000 pounds)
Graham Paper Company, 10.02 cents. (40,000 pounds)
Butler Company, 10.12 cents. (40,000 pounds)

No. 51. R. P. Andrews Paper Company, 11.98 cents.

No. 52. R. P. Andrews Paper Company, 11.50 cents (white); 12.00 cents (blue).

No. 53. Whitaker Paper Company, 13.55 cents.

No. 54. Eastern Corp., 8.95 cents. (120,000 pounds)

No. 55. Whitaker Paper Company, 6.90 cents. (900,000 pounds)
R. P. Andrews Paper Company, 7.27 cents. (500,000 pounds)
Eastern Corp., 7.28 cents. (1,080,000 pounds)

No. 56. Barton, Duer & Koch Paper Company, 7.22 cents. (700,000 pounds)
Perkins-Goodwin Company, 7.25 cents. (1,800,000 pounds)
R. P. Andrews Paper Company, 7.27 cents. (750,000 pounds)

No. 57. Butler Company, 7.97 cents.

No. 58. Cauthorne Paper Company, 7.25 cents. (420,000 pounds)
Marquette Paper Company, 8.15 cents. (250,000 pounds)
Marquette Paper Company, 8.23 cents. (230,000 pounds)

No. 59. Barton, Duer & Koch Paper Company, 6.97 cents.

No. 60. No bids.

No. 61. Marquette Paper Company, 9.25 cents. (250,000 pounds)

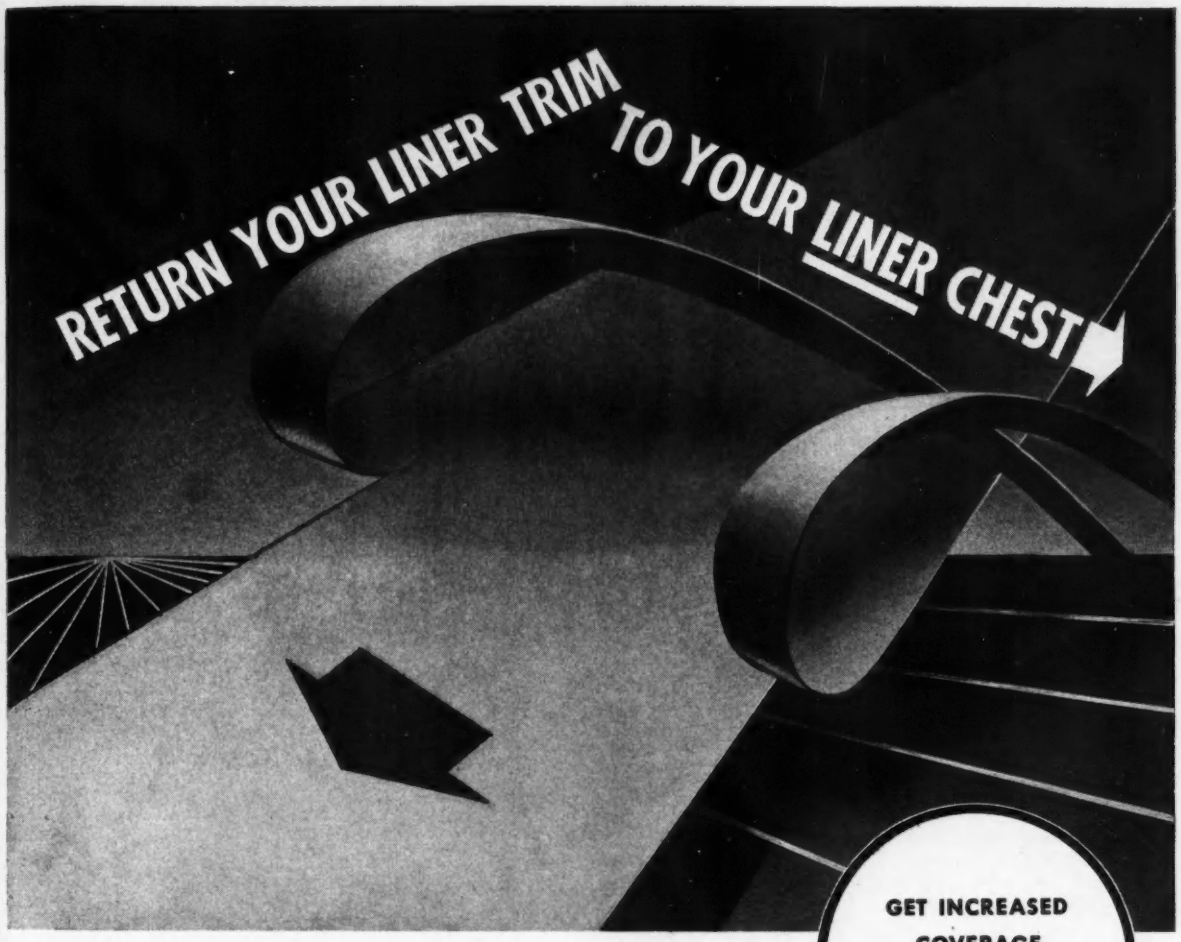
No. 62. Marquette Paper Company, 9.25 cents.

No. 63. Mead Sales Company, 7.76 cents. (140,000 pounds)

No. 64. R. P. Andrews Paper Company, 8.97 cents.

No. 65. R. P. Andrews Paper Company, 14.11 cents. (40,000 pounds)
Graham Paper Company, 15.32 cents. (50,000 pounds)
Stanford Paper Company, 15.56 cents. (150,000 pounds)

No. 66. Mudge Paper Company, 17.86 cents. (190,000 pounds)
Graham Paper Company, 20.42 cents. (50,000 pounds)
No. 67. Mudge Paper Company, 17.86 cents. (25,000 pounds)
No. 69. Paper Corp. of U. S., 21.12 cents. (240,000 pounds)
Barton, Duer & Koch Paper Company, 23.70 cents. (120,000 pounds)
Graham Paper Company, 26.04 cents. (50,000 pounds)
No. 70. Graham Paper Company, 9.65 cents.
No. 71. R. P. Andrews Paper Company, 9.55 cents. (50,000 pounds)
No. 72. Paper Corp. of U. S., 12.00 cents. (60,000 pounds)
No. 73. Import Paper Company, 14.25 cents. (20,000 pounds)
No. 75. Marquette Paper Company, 19.50 cents. (90,000 pounds)
No. 76. Stanford Paper Company, 17.75 cents. (120,000 pounds)
Chicago Paper Company, 19.30 cents. (100,000 pounds)
Butler Company, 19.81 cents. (150,000 pounds)
Barton, Duer & Koch Paper Company, 21.00 cents. (100,000 pounds)
Paper Corp. of U. S., 21.82 cents. (120,000 pounds)
Old Dominion Paper Company, 25.979 cents. (10,000 pounds)
No. 77. Barton, Duer & Koch Paper Company, 19.25 cents.
No. 78. Marquette Paper Company, 22.00 cents. (30,000 pounds)
No. 79. Walker Goulard Plehn Company, Inc., 18.89 cents. (60,000 pounds)
Barton, Duer & Koch Paper Company, 22.00 cents. (900,000 pounds)
No. 80. No bids.
No. 83. R. P. Andrews Paper Company, 38.00 cents.
No. 84. Old Dominion Paper Company, 27.448 cents. (24,000 pounds)
No. 85. Barton, Duer & Koch Paper Company, 19.75 cents. (120,000 pounds)
R. P. Andrews Paper Company, 28.00 cents. (60,000 pounds)
No. 102. R. P. Andrews Paper Company, 7.51 cents. (340,000 pounds)
Marquette Paper Company, 8.47 cents. (200,000 pounds)
No. 103. Whitaker Paper Company, 7.25 cents.
No. 105. Aetna Paper Company, 15.20 cents. (75,000 pounds)
Walker Goulard Plehn Company, 17.18 cents. (40,000 pounds)
No. 106. Aetna Paper Company, 12.44 cents. (100,000 pounds)
Virginia Paper Company, 12.72 cents. (40,000 pounds)
Bradner Smith & Company, 12.72 cents. (80,000 pounds)
Baxter Paper Company, 13.55 cents. (50,000 pounds)
Walker Goulard Plehn Company, 13.92 cents. (40,000 pounds)
No. 107. R. P. Andrews Paper Company, 11.92 cents. (80,000 pounds)
Aetna Paper Company, 12.22 cents. (400,000 pounds)
Butler Company, 12.68 cents. (600,000 pounds)
Walker Goulard Plehn Company, 13.90 cents. (40,000 pounds)
No. 108. Aetna Paper Company, 12.23 cents. (400,000 pounds)
Butler Company, 12.68 cents. (600,000 pounds)
Resolute Paper Products Corp., 13.90 cents. (40,000 pounds)
No. 109. Aetna Paper Company, 12.21 cents. (100,000 pounds)
Whitaker Paper Company, 13.47 cents. (100,000 pounds)
Resolute Paper Products Corp., 13.88 cents. (40,000 pounds)
No. 110. No bids.
No. 111. No award.
No. 112. Aetna Paper Company, 12.19 cents. (100,000 pounds)
No. 113. No bids.
No. 114. Aetna Paper Company, 12.97 cents (100,000 pounds)
R. P. Andrews Paper Company, 14.28 cents. (80,000 pounds)
Barton, Duer & Koch Paper Company, 14.61 cents. (400,000 pounds)
No. 115. R. P. Andrews Paper Company, 12.42 cents. (80,000 pounds)
Aetna Paper Company, 12.75 cents. (100,000 pounds)
Old Dominion Paper Company, 14.20 cents. (50,000 pounds)
Barton, Duer & Koch Paper Company, 14.59 cents. (40,000 pounds)
No. 116. Aetna Paper Company, 12.78 cents.
No. 117. No bids.
No. 118. No bids.
No. 120. No bids.
No. 121. Aetna Paper Company, 13.94 cents. (400,000 pounds)
Graham Paper Company, 14.49 cents. (300,000 pounds)
R. P. Andrews Paper Company, 15.27 cents. (200,000 pounds)
No. 122. Aetna Paper Company, 13.83 cents. (300,000 pounds)
R. P. Andrews Paper Company, 15.40 cents. (120,000 pounds)
No. 123. No award.
No. 124. Mudge Paper Company, 16.62 cents.
No. 125. Paper Corp. of U. S., 21.50 cents.
No. 126. Paper Corp. of U. S., 19.27 cents.
No. 128. Paper Corp. of U. S., 24.29 cents.
No. 129. Paper Corp. of U. S., 24.29 cents.
No. 140. Barton, Duer & Koch Paper Company, 25.25 cents.
No. 141. Paper Corp. of U. S., 23.80 cents.
No. 151. No award.
No. 152. Barton, Duer & Koch Paper Company, 8.50 cents.
No. 154. Baxter Paper Company, 14.35 cents.
No. 155. Walker Goulard Plehn Company, 14.84 cents. (60,000 pounds)
No. 156. Mathers-Lamm Paper Company, 13.50 cents.



GET INCREASED COVERAGE FROM A TON OF LINER PULP

Liner Stock			Lbs. Saved /24 Hrs. @ Speeds Shown				
Trim	**Caliper**	**Basic Wt.**	**100'**	**150'**	**200'**	**250'**	**300'**
1"	.004	16.8#	202	302	403	504	605
	.005	21. #	252	378	504	630	756
	.006	25.2#	302	454	605	756	907
	.004	16.8#	403	605	806	1008	1210
	.005	21. #	504	756	1008	1260	1512
2"	.006	25.2#	605	907	1210	1512	1814
	.004	16.8#	605	907	1210	1512	1814
3"	.005	21. #	756	1134	1512	1890	2268
	.006	25.2#	907	1361	1814	2268	2722
	.004	16.8#	806	1210	1613	2016	2419
4"	.005	21. #	1008	1512	2016	2520	3024
	.006	25.2#	1210	1814	2419	3024	3629
	.004	16.8#	1008	1512	2016	2520	3024
5"	.005	21. #	1260	1890	2520	3150	3780
	.006	25.2#	1512	2268	3024	3780	4536
	.004	16.8#	1210	1814	2419	3024	3629
6"	.005	21. #	1512	2268	3024	3780	4536
	.006	25.2#	1814	2722	3629	4536	5443

SAVINGS EQUALS COST OF LINER STOCK AT MACHINE

MINUS { FILLER COST PLUS OPERATING COST OF VACUUM DECKLE

Want to save liner stock . . . want to make it stret-t-ch-hh farther than you ever thought possible? Then look at the facts and figures to the left.

If you know your liner trim, you can figure out the saving. And it's a real saving, both in money and stock.

How is this possible? The answer lies in the **Dieckbrader Vacuum Deckle.** For full facts and figures, call in your secretary and write **Shartle Brothers, Middletown, Ohio. Division of the Black-Clawson Co.**

SHARTLE BROS.
DIECKBRADER VACUUM DECKLE

No. 157. Resolute Paper Products Corp., 15.57 cents.
No. 160. Mudge Paper Company, 15.66 cents. (75,000 pounds)
Baxter Paper Company, 16.15 cents. (105,000 pounds)
No. 161. Mudge Paper Company, 15.66 cents. (30,000 pounds)
Frank Parsons Paper Company, 16.50 cents. (42,000 pounds)
No. 162. Mudge Paper Company, 15.66 cents. (100,000 pounds)
Frank Parsons Paper Company, 16.50 cents. (140,000 pounds)
No. 163. Mudge Paper Company, 15.66 cents. (75,000 pounds)
Walker Goulard Plehn Company, 16.88 cents. (45,000 pounds)
No. 164. Barton, Duer & Koch Paper Company, 17.58 cents.
No. 165. No bids.
No. 168. Barton, Duer & Koch Paper Company, 18.00 cents.
No. 169. Barton, Duer & Koch Paper Company, 18.00 cents.
No. 170. Mudge Paper Company, 19.96 cents. (30,000 pounds)
Frank Parsons Paper Company, 20.50 cents. (18,000 pounds)
No. 171. Mudge Paper Company, 19.96 cents. (20,000 pounds)
Frank Parsons Paper Company, 20.50 cents. (10,000 pounds)
No. 172. No bids.
No. 173. No bids.
No. 176. Paper Corp. of U. S., 22.05 cents.
No. 177. Paper Corp. of U. S., 22.05 cents.
No. 178. Paper Corp. of U. S., 22.05 cents.
No. 179. Paper Corp. of U. S., 22.05 cents.
No. 180. Paper Corp. of U. S., 22.05 cents.
No. 181. Paper Corp. of U. S., 22.05 cents.
No. 184. R. P. Andrews Paper Company, 8.15 cents. (100,000 pounds)
Mudge Paper Company, 8.20 cents. (100,000 pounds)
Mudge Paper Company, 8.00 cents. (200,000 pounds)
No. 190. Aetna Paper Company, 13.76 cents. (100,000 pounds)
Barton, Duer & Koch Paper Company, 15.16 cents. (150,000 pounds)
Walker Goulard Plehn Company, 16.36 cents. (80,000 pounds)
Frank Parsons Paper Company, 16.50 cents. (40,000 pounds)
No. 191. Walker Goulard Plehn Company, 16.50 cents.
No. 192. Walker Goulard Plehn Company, 17.08 cents. (80,000 pounds)
No. 193. Walker Goulard Plehn Company, 17.22 cents.
No. 196. Barton, Duer & Koch Paper Company, 23.50 cents. (60,000 pounds)
Walker Goulard Plehn Company, 25.89 cents. (48,000 pounds)
No. 197. Mathers-Lamm Paper Company, 14.93 cents.
No. 201. Whitaker Paper Company, 9.75 cents.
No. 202. Dill & Collins, Inc., 10.27 cents. (India); 10.77 cents. (Green)
No. 203. Marquette Paper Company, 8.98 cents.
No. 204. Marquette Paper Company, 8.98 cents.
No. 205. Walker Goulard Plehn Company, 12.45 cents.
No. 209. Old Dominion Paper Company, 5.747 cents.
No. 210. Paper Corp. of U. S., 4.92 cents.
No. 211. Paper Corp. of U. S., 7.49 cents.
No. 212. Paper Corp. of U. S., 7.24 cents.
No. 213. R. P. Andrews Paper Company, 22.50 cents.
No. 214. R. P. Andrews Paper Company, 21.00 cents.
No. 215. Mudge Paper Company, 23.40 cents.
No. 217. No bids.
No. 218. No bids.
No. 219. No bids.
No. 220. Paper Corp. of U. S., 8.10 cents.
No. 251. Cauthorne Paper Company, Inc., 12.75 cents.
No. 252. Eureka Specialty Printing Company, $13.32 per M sheets.
No. 254. Bradner Smith & Company, 7.33 cents.
No. 255. Cauthorne Paper Company, Inc., 8.50 cents.
No. 256. Bradner Smith & Company, 8.25 cents.
No. 257. Bradner Smith & Company, 8.51 cents.
No. 258. Mathers-Lamm Paper Company, 7.32 cents.
No. 259. R. P. Andrews Paper Company, 6.67 cents.
No. 262. R. P. Andrews Paper Company, 8.85 cents.
No. 263. Barton, Duer & Koch Paper Company, 8.50 cents.
No. 264. Barton, Duer & Koch Paper Company, 4.64 cents.
No. 265. Mudge Paper Company, 8.25 cents.
No. 271. R. P. Andrews Paper Company, 7.25 cents.
No. 276. Barton, Duer & Koch Paper Company, 8.25 cents.
No. 277. Barton, Duer & Koch Paper Company, 9.25 cents.
No. 280. Mudge Paper Company, 11.25 cents.
No. 281. Paper Corp. of U. S., 5.50 cents.
No. 302. Bradner Smith & Company, $28.05 per M sheets. ;
Bradner Smith & Company, $27.21 (On skids). (Either bid.)
No. 303. Bradner Smith & Company, $40.31 per M sheets.
Bradner Smith & Company, $39.08 (on skids). (Either bid.)
No. 304. Bradner Smith & Company, $56.05 per M sheets.
Bradner Smith & Company, $54.33 (on skids). (Either bid.)
No. 305. Bradner Smith & Company, $35.12 per M sheets.
Bradner Smith & Company, $34.02 (on skids). (Either bid.)
No. 306. No award.
No. 307. No bids.
No. 308. Old Dominion Paper Company, 5.497 cents.
No. 309. Old Dominion Paper Company, 5.497 cents.
No. 310. No bids.
No. 325. R. P. Andrews Paper Company, 6.17 cents. (600,000 pounds)
Whitaker Paper Company, 6.23 cents. (900,000 pounds)
No. 326. R. P. Andrews Paper Company, 6.17 cents. (600,000 pounds)
Whitaker Paper Company, 6.20 cents. (900,000 pounds)

No. 327. R. P. Andrews Paper Company, 6.17 cents. (600,000 pounds)
Barton, Duer & Koch Paper Company, 6.98 cents. (900,000 pounds)
No. 351. Barton, Duer & Koch Paper Company, $7.75 per 100 sheets.
No. 352. Barton, Duer & Koch Paper Company, $18.85 per 100 sheets.
No. 360. Bartgis Bros. Company, 2.50 cents.
No. 361. Bartgis Bros. Company, 2.25 cents.
No. 362. Old Dominion Paper Company, 4.939 cents.
No. 363. No bids.
No. 364. No bids.
No. 365. No bids.
No. 366. Mathers-Lamm Paper Company, 4.08 cents.
No. 367. R. P. Andrews Paper Company, 4.14 cents.
No. 368. Consolidated Paper Company, 5.40 cents.

Chemicals for Paper in S. C.

CHARLESTON, S. C., November 26, 1941—Among opportunities for industries contributing to defense to which attention is called by the South Carolina State Planning Board are a Solvay-Soda-Alkali plant and an Electrolytic Chlorine-Alkali plant in the Santee-Cooper region of South Carolina.

Chlorine is much in demand for defense industries. Both chlorine and alkali are also used by the paper, textile, rayon and bromine industries of North Carolina, South Carolina, and Georgia.

Recent commercial development of the use of sodium chlorite for bleaching kraft paper pulp opens new uses for both alkali and chlorine in the vast paper industry which is already established in North Carolina, South Carolina, and Georgia. There is no local competition supplying the demand for an alkali-chlorine industry in the Santee-Cooper region.

Business people in this area are looking forward to the establishment of a big paper plant supplied by power from the Santee-Cooper Project to offer employment to returning soldiers.

South Carolina is one of the states where years of careful forestry practices are bringing their reward. Fire prevention methods, especially, have done much to save the life of the forests which cover 65 per cent of South Carolina's area. Mr. H. A. Smith, State Forester of South Carolina, said that as long ago as 1936 the natural increase of the pine forests of the Coastal area of South Carolina was about 850,000,000 board feet per year of saw mill size. But the consumption at that time was only 116,000,000 board feet per year. There are plenty of opportunities for a kraft paper mill or a newsprint mill in the Santee-Cooper area, Mr. Smith stated.

It is well known that a number of Southern papers are eager to see a newsprint mill started and will subscribe to the paper produced when it is done.

Bird-Archer Co. Changes

The Bird-Archer Company, 90 West street, New York, announces the appointment of G. C. Walker as Eastern Industrial Sales Manager; E. A. Lowenthal as Western Industrial Sales Manager and George H. Sill as Railroad Sales Manager.

Start at The Beginning to
INCREASE YOUR PRODUCTION
The best place to start to increase your production is at the beginning . . . and the beginning in any mill is with the process water. If your process water fails you . . . either through shortage or through poor quality caused by dirt, debris, vegetable matter or undesirable chemical content . . . all other improvements to increase production are of no avail.
You can do a lot toward insuring the workability of your various steps to increase production if you first make sure that you have an adequate installation of good Norwood Filters, in good condition. We'll be glad to work with you.
Get Your Set of Engineering Data Units On Filters and Other Water Treating Equipment. Write Today! Ask for Complete Set of Data Units on Industrial Filters.
Get a Good Start And a Good Finish With
NORWOOD
WATER FILTERS AND PAPER FINISHING MACHINERY
THE NORWOOD ENGINEERING COMPANY
17 No. Maple St., Florence, Mass.

Buy Paper Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

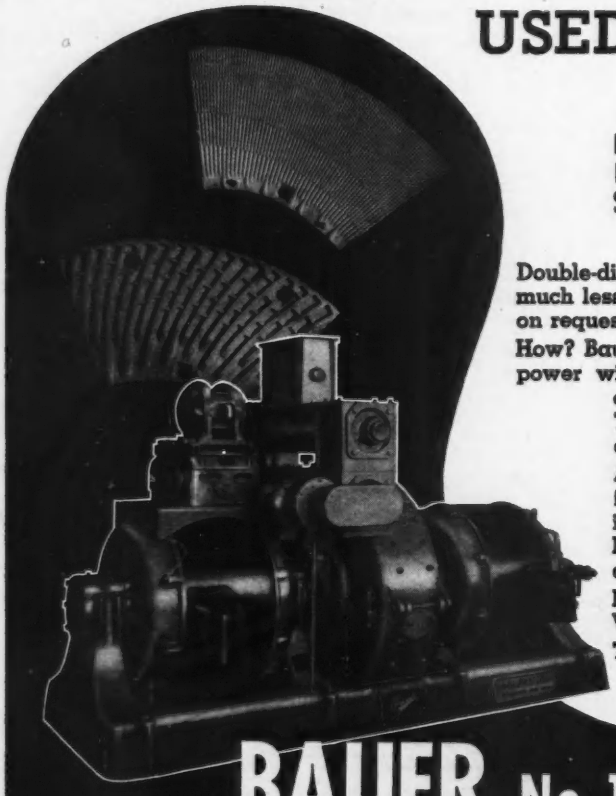
WASHINGTON, D. C., December 10, 1941—During the week ending November 22, the Government purchased $168,033.70 worth of paper under the Walsh-Healey act, with the following orders:

$11,179.20 worth of mimeo paper for War QMC N. J. from Marquette Paper Company; $11,736 worth of bond paper for GPO from R. P. Andrews Paper Company; $10,108.50 worth of bond paper for GPO from R. P. Andrews Paper Company; $15,120 worth of newsprint paper for GPO from Paper Corporation of U. S.; $11,340 worth of newsprint paper for GPO from Paper Corporation of U. S.; $23,790 worth of book paper for GPO from Butler Company; $45,000 worth of writing paper for GPO from Central Ohio Paper Company; $15,100 worth of book paper for GPO from Stanford Paper Company; $12,120 worth of index cards for Treasury Proc. from Majestic File Foldier Corporation; $12,540 worth of teletype paper for Treasury Proc. from Link Paper Company.

Cameron Presents Ambulance

The illustration presented herewith shows Dr. Fred W. Routley, National Commissioner of the Canadian Red Cross accepting the gift of an ambulance and hospital supplies donated by the Cameron Machine Company of Canada, Ltd., and Mrs. James A. Cameron in memory of her late husband and founder of the company. In the photo left to right: Driver Green; Corporal Proctor, Red Cross Transport Service; Fred J. Campbell, Director of Cameron Machine Company of Canada, Ltd., Montreal; Dr. Routley, also Victor Goggin of New York, president of the Maple Leaf Fund, Inc., an American Organization of Canadians and friends of Canada in the United States.

ACCEPTING THE CAMERON AMBULANCE



USED .006 LINER.....
NOW USES .004

BAUER DOUBLE-DISC PULPERS PERMIT BOARD MILL TO MAKE SUBSTANTIAL STOCK SAVINGS

Double-disc action means less cutting and shortening. So much less, in fact, that one mill forming folding board (name on request) obtained a 33% saving on Kraft liner.

How? Bauer pulpers produce a .004 liner of greater covering power with no sacrifice of strength . . . greater coverage even than with the .006 liner formerly made. This result made possible by the unusual defibering action of Bauer machines.

Apply your liner costs and tonnage figures for a year to a comparative saving. Maybe it wouldn't be 33% . . . maybe only 20%. Figure up what even a low percentage reduction would save.

Full facts and figures await your request. Write, wire, or telephone today.

THE BAUER BROS. CO., Springfield, Ohio

BAUER No. 185 DOUBLE DISC PULPERS

Labor Violations Laid to Two Mills

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 10, 1941—Charged in 50 counts with illegal interstate shipment of paper manufactured in violation of the Wage and Hour Law—the International Paper Company, the Southern Kraft Corporation, and six officials were named in an information filed with Federal Judge Isaac M. Meekins in the Eastern District Court, Florence, S. C., last week. General Philip B. Fleming, administrator of the Wage and Hour Division, U. S. Department of Labor, announced that the information was filed by the Assistant U. S. Attorney, Louis M. Shimel. John J. Babe of the U. S. Department of Labor Solicitor's office assisted the U. S. Attorney.

Richard J. Cullen of New York, president, and John H. Friend, vice-president of both corporations, were made defendants in the information. Also named were Claude O. Brown, manager of the Woodlands Division; Joseph E. McCaffrey, Mr. Brown's assistant; Abner Donham, superintendent of the Woodlands Division, and Kelso H. Powell, mill manager. The latter two are connected with the Georgetown, S. C., mill of the Southern Kraft Corporation. Messrs. Friend, Brown and MacCaffrey are officials at the Mobile headquarters of the Southern Kraft Corporation.

The criminal action based on an investigation by the Wage and Hour Division, charges continuing violations beginning when the law became effective in the fall of 1938. Specifically, the information alleged ten shipments of goods illegally produced each in the months of December, 1938; November, 1939; August, 1940; November, 1940, and April, 1941.

Under the Fair Labor Standards Act it is a violation of the law to ship into interstate commerce goods in the manufacture of which employees have been paid lower than the minimum of 30 cents an hour or who have not been paid overtime at the rate of time and one-half for work done after 40 hours in a workweek. During the first month covered by the information, December, 1938, the minimum wage was only 25 cents an hour, and overtime did not start to run until after 44 hours. With respect to November, 1939, and August, 1940, the overtime pay did not start to run until after 42 hours a week. The 40-hour standard was reached on October 24, 1940.

The action filed last week is part of an effort by the Department of Labor to stop substandard wages paid in the pulp and paper industry through prosecution of those firms and individuals who traffic in the goods produced by this underpaid labor.

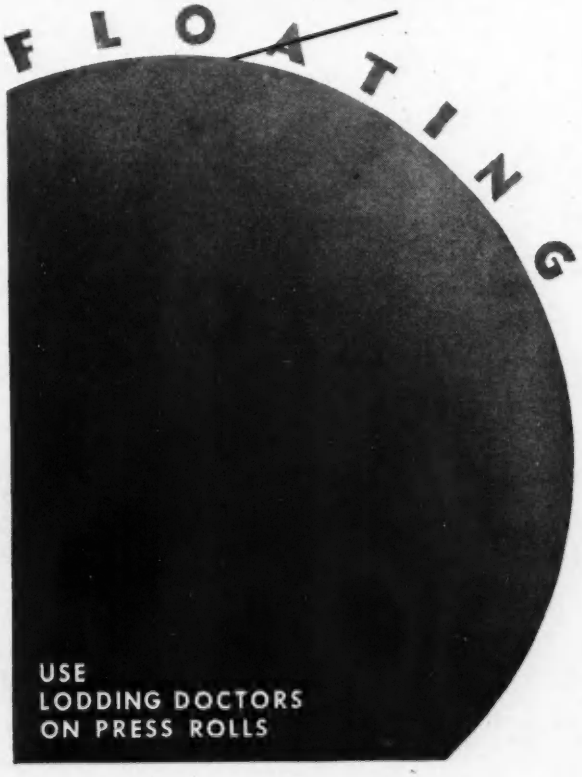
On October 28 at Shreveport, La., the Southern Advance Bag and Paper Company, a Maine Corporation, and three of its top officials were indicted by a Federal Grand July on 12 counts embodying similar charges to those filed at Florence today. The indicted corporation which operates a bag and paper mill at Hodge, Louisiana, and the officials have entered a plea of "not guilty" and have been released under bond.

The action brought last week was taken under Section 15(a)(1) of the Act, which makes it unlawful to sell or ship in commerce any goods in the production of which any employee was employed in violation of the minimum wage or overtime provisions of the Act. This section has become known as the "hot goods" clause.

FITS—NOT FIGHTS
the Roll it Cleans

The patented "Floating Blade Principle" of the Lodding Doctor enables it to do all that's expected of a doctor, i.e., keep the roll clean, yet it exerts practically no pressure on the roll. Since drag or braking action of the doctor blade becomes virtually nil, important power savings result. Floating, taking the place of forcing, safeguards against the hazard of roll scoring and, when used on Breast or Wire Rolls, it saves unnecessary strain on fourdrinier wires. ...May we send you a few names of users in mills similar to yours? Write either the Lodding Engineering Corp., Worcester, Mass., or the W. E. Greene Corp., Woolworth Bldg., New York.

LODDING
FOR EVERY Doctors POSITION
FLOATING



Government Paper Bids

WASHINGTON, D. C., December 10, 1941—Government Printing Office has received the following bids for 77,940 pounds of 34 x 56 white sulphite writing paper: Cauthorne Paper Company, 7.5 cents; and R. P. Andrews Paper Company, 7.27 cents.

For 390,000 pounds of 33 x 63 cream bristol board: R. P. Andrews Paper Company, 6.74 cents.

For 120,312 pounds of 39⅜ x 56 white antique paper: Paper Corporation of U. S., 8.12 cents.

For 10,000 pounds of 50% rag, 21 x 32 salmon ledger paper: Walker Goulard Plehn Company, 17.7 cents and Resolute Paper Products Inc., 17 cents.

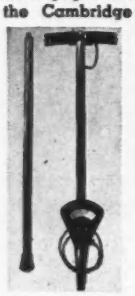
For 10,000 pounds of 100% rag, 21 x 32 white ledger paper: Mudge Paper Company, 27.9 cents; R. P. Andrews Paper Company, 26.39 cents; Paper Corporation of U. S., 25 cents; and Resolute Paper Products, Inc., 28.5 cents.

J. F. Seagraves Heads Sabin Robbins

CINCINNATI, Ohio, December 8, 1941—J. F. Seagraves, 16 Belsaw Place, Clifton, was named president of the Sabin Robbins Paper Company by directors, it was announced recently. He succeeds D. W. Whitelaw, who died on November 5. Seagraves started with the company as salesman in 1905 and had been chairman-vice president. C. W. Schank, Detroit, was elected to fill the vacancy on the board. At the same time, George K. Kaneen, in charge of the concern's Los Angeles branch, was chosen a vice president.

HAS SHOP APPROVAL

Real paper makers appreciate the worth of the Cambridge Surface Pyrometer and like to use it. It is a rugged, self-contained production instrument that accurately determines the temperature of moving or stationary rolls. Helps maintain the desired progressive temperature change in the drying roll train thus avoiding the cause of spots, cockle, curl and blisters.



Write for bulletin 194S.

The Cambridge is made in a hand model and with the extension attachment to reach those hard-to-get-at places.

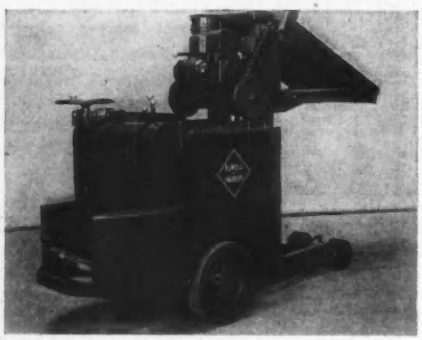
CAMBRIDGE INSTRUMENT CO., INC.,
3732 Grand Central Terminal, New York, N. Y.

CAMBRIDGE
SURFACE PYROMETERS

Streamlined Tilting Platform Truck

The Elwell-Parker type ELN-6 tilting platform truck has a rated capacity of 6000 pounds and can be used (with dump hopper) for handling prepared materials or for transporting and rolling off rolls on platform only.

Prepared materials in paper mill can be picked up



NEW ELWELL-PARKER TRUCK

at varying distances and dumped into beaters at a height of several feet from the floor through the use of a hopper attached to the truck platform.

In addition to time saved, the even discharge into the beaters eliminates the need of forking at the beaters, thus avoiding injury hazard to workers.

Governors to Cooperate

WASHINGTON, D. C., December 10, 1941—Cooperation of governors in the various states in impressing upon the public the importance of conserving waste paper as a defense measure has been asked by Leon Henderson, administrator, Office of Price Administration, in a letter to state executives.

Mr. Henderson's letter to the governors is in line with the OPA policy of aiding in every way possible the conservation campaign started sometime ago by the waste paper consuming industries. Mr. Henderson's action has the approval of the Bureau of Industrial Conservation in the Office of Production Management, which is undertaking a long term waste material conservation campaign.

Four specific suggestions were made to the governors:

(1)—Make sure that all state and municipal institutions and buildings stop burning waste paper immediately.

(2)—Urge all state, county and municipal authorities to put real effort behind this drive.

(3)—Urge the public in press conferences and radio addresses to conserve waste paper.

(4)—Urge the charitable organizations and waste paper dealers in each state to put every effort behind greater waste paper accumulation.

Carter, Rice Salesmen Meet

BOSTON, Mass., December 8, 1941—General conditions in the paper industry were discussed at a sales meeting of Carter Rice & Co. Corporation after a dinner at the South Station, Friday evening, November 28. Sales Manager Frank H. Winter presided, with salesmen on the local staff participating.

Must Pay Minimum Wage

An injunction compelling future compliance with the converted paper products wage order by the payment of at least 38 cents an hour to its employees, was filed today in U. S. District Court, New York City, by the Wage and Hour Division, U. S. Department of Labor, against the Premier Sample Company, Inc., 137 Varick street, one of the largest sample card firms in the city.

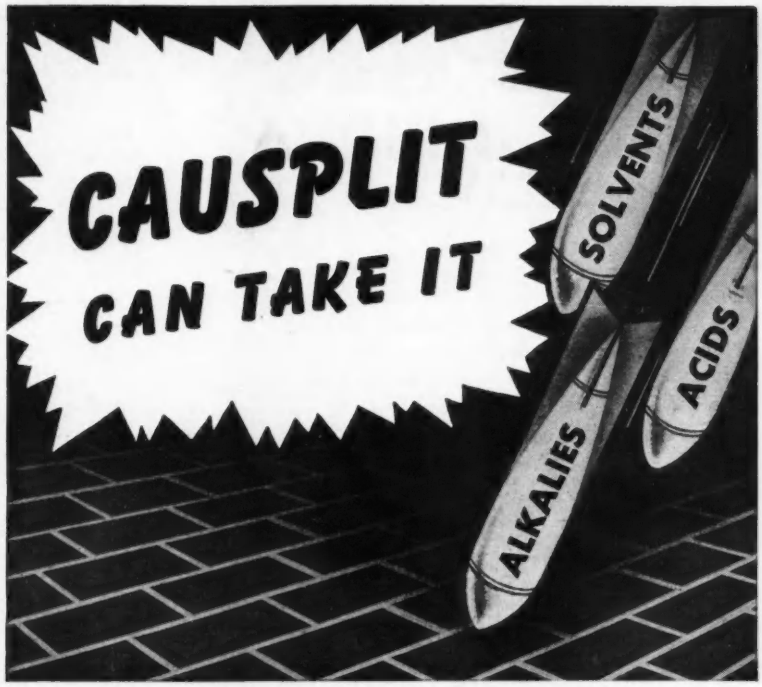
The injunction confirming the applicability of the converted paper products wage order to the sample card industry was signed by Federal Judge William Bondy on application by Arthur E. Reyman, Regional Attorney of the Wage and Hour Division, and is expected to serve as a precedent for the sample card industry in the matter of the minimum wage to be paid by the industry under the Wage and Hour law.

The Premier Sample Company, Inc. which employs about 183 persons is engaged in the manufacture of sample cards and books which are not only sold across state lines but are used by many New York City firms to facilitate their interstate business in dresses, blouses, piecegoods and similar lines.

In a legal opinion written in reply to a protest on the part of attorneys for the sample card industry that the converted paper products wage order did not apply to the industry, the Washington office of the Division stated:

"It is obvious that sample book and card producers are engaged in the manufacture of a product in which paper is a basic component. They use cardboard as the base upon which to mount textile, apparel or other material. Included in the operations necessary to their production are the cutting of the fabric to form swatches and the mounting of swatches on the card. The plain card by itself is not a sample card. It becomes such only when the material which it is designed to demonstrate is attached to it."

Under the converted paper products wage order, the Division ruled, sample cards are included in the group of "products not elsewhere classified," in the production of which a minimum wage of 38 cents an hour was prescribed, effective June 30, 1941.



CAUSPLIT is a new quick-setting cement with amazing chemical and mechanical resistance. It withstands a wide range of strong acids, alkalies and solvents at temperatures up to 350°F.

In addition, it is easy to handle and free from bothersome acid ingredients. Extensive tests have proved Causplit to be first-rate for corrosion-proof construction of industrial equipment. Actually, Causplit is a considerable improvement over Asplit, which has been widely used in many industries for more than 7 years.

CHEMICAL PLANTS: Causplit is the ideal cement not only because of its resistance to hydrofluoric, phosphoric and other strong acid conditions, but also because it is unaffected by alkalies, such as caustic, soda ash and hypochlorites. Causplit naturally stands up under the salts of alkalies and acids in the linings of equipment and floors.

PULP AND PAPER MILLS: Used in pulp digesters and bleaching systems to withstand both acids and alkalies. For instance, it is unattacked by sodium sulphite, sulphurous acid, chlorine, as well as hypochlorite, caustic soda and soda ash. Its characteristics enable it to withstand both mechanical and thermal shocks. Here again Causplit can be used for both tank and floor work.

STEEL MILLS: Causplit is used in the equipment for both acid and alkali cleaning of steels. It is not attacked by hydrochloric and sulphuric acids in the strengths used in the steel industry. It differs from most other acid-proof cements in that it is also resistant to hydrofluoric acid, which is used in the stainless steel industry.

Since we have manufactured acids, alkalies and other chemicals for many years, we ourselves have had considerable experience in the use of special cements for corrosion-resistant equipment. Write to us for technical help with your specific problems.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA
NEW YORK · CHICAGO · ST. LOUIS · PITTSBURGH · WYANDOTTE · TACOMA

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR

Vol. 113 December 11, 1941 No. 24

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

INDUSTRIAL LEADERSHIP

In an address at the 46th annual meeting of the National Association of Manufacturers Association, at New York on December 5, Dr. Claude Robinson, president of the Opinion Research Corporation, discussed some interesting aspects of industrial leadership under the subject of "The public, management and defense." Referring to one of the leading questions of today, Dr. Robinson said that, "The crucial question for the manufacturer of social forms, just as for the manufacturer of economic goods, is: What does the public want and need and what will it buy? . . . For many years, part of the time as an associate of Dr. Gallup and the remainder as head of my own organization, I have sought answers to the question: What do people want? I have talked, directly and indirectly through our sampling machinery, to several hundred thousand representative Americans on all manner of business and political problems. Through all this stream of information, two great and compelling wants in the realm of social forms clearly appear."

Enumerating the primary needs of the public Dr. Robinson said: "The first want is economic security; some sharing of job and dependency risks, or to put it another way, insurance against summary loss of job and income when that loss is not the fault of the individual. The second want is national security; protection from foreign aggression, or in a broader sence, a political and military organization of the world that will permit, in this country at least, the continuance of the American pattern of life. Now, of course, wants other than these two are distinguishable. People want freedom. Workers want higher wages. But the wants of economic security and national security appear to be uppermost in the people's consciousness. . . . They are the wants which the three fabricators of social forms, the politician, the labor leader, and the industrialist, are in competition to supply."

Referring to the rapid changes in the social pattern, Dr. Robinson said that, "We have data on the popularity of New Deal measures back to 1935-36, when the Gallup and Fortune polls started. The evidence shows large public support for key New Deal Measures. For example: 58% of the public thought Congress should set a limit on working hours in each business and industry; 61% thought the Federal government ought to set minimum wages; 69% thought it government's responsibility to pay the living expenses of needy persons out of work; 89% favored government old-age pensions for needy persons; 73% approved of the social security tax on wages, and 62% thought that government regulation of the stock exchange had helped investors."

In giving his explanation of the public support given to what President Roosevelt has referred to as the more "abundant life", Dr. Robinson said in part that, "During the New Deal period from 1932 on, the politicians laid over the initiative of individuals such a blanket of rules . . . that one wondered if the thing called enterprise could possibly survive. Industry had built up the wealth that was being shared, but no one gave them much credit for that. American manufacturers had come closer to a solution of the problem of poverty than had any industrial society; yet the public was following another leadership. Why? There are several answers to that question. The politicians offered the public specific solutions to a problem; industry's solution was general. The politicians took the initiative; industry stood on the defensive. The politicians led the people to believe they had good motives; industry's motives were pictured as selfish and grasping. . . . The politicians spent a good deal of their time telling the people about their achievements. Industry was busy producing goods; it had to learn the new technique of public relations and was slower in getting started."

Discussing public reaction to industrial and labor leadership in the national defense program, Dr. Robinson said that, "Industrial leadership has stepped up and said: 'Tell us what you want and we will produce it'. It has cooperated to the full. Labor leadership, on the other hand, has said: 'This is our chance to get what we want. You can't produce without labor and we will either get our demands or we will strike'. What is the effect in public acceptance of the two leaderships? . . . Witness the following evidences of public good will for industrial leadership and ill will for labor leadership; 68% in October of this year said they were in favor of giving businessmen more authority in the defense program; 68% in March said they thought industrial leaders were trying harder than labor leaders to help defense. Only 12% thought labor leaders were trying harder to help defense; 63% in October said production for

defense was going ahead too slowly. When blame for this condition is assessed 49% blame labor leadership; 33% blame government and 9% blame industrial management."

In conclusion, Dr. Robinson gave the following formula: "(1) Offer a solution for the problem the public wants solved. After the war the number one problem will be how to get back to a peace economy without the chaos of unemployment. . . . If the enterprise idea is to be preserved at all, industrial leadership must have its own blueprint for the cooperation of government, management and labor in the post-war readjustment. (2) Take the offensive in offering the public industry's solution for post-war adjustment. (3) Public-relationwise, keep in the position of being identified with something the public wants. (4) Establish with the public the good motives of industry. (5) Surround the post-war plan with symbols that have mass appeal instead of class appeal. Perhaps the plan could be called 'The post-war security plan'. Perhaps in talking about the system we now call free or private enterprise, we might describe it as the 'high wage system', or by some other name suggesting mass benefits. (6) Tell the public about the program and keep telling them. The stake you are playing for is public acceptance of your leadership."

OPM Clarifies Packaging Rating

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 3, 1941—The Containers Branch of the Office of Production Management today pointed out that packaging material may not be obtained with the assistance of Preference Rating Order P-22, commonly known as the Maintenance and Repair Order.

It was emphasized that no packaging material is included under this order, and that no preference rating under it can be applied for the obtaining or placing of purchasing orders for any packaging material.

"Packaging material" includes bags of all types, barrels, bottles, boxes, cans, containers, cooperage, cores, crates, cartons, cases, tubes, labels, wrappers, wrapping papers, liners, envelopes, cushioning or protective packing material, or their component parts made of paper, wood, fabric, glass, plastic, metal, or any other material.

The foregoing applies to returnable packaging material, as well as that used only one time.

Dennison Mfg. Co. to Give Bonus

FRAMINGHAM, Mass., December 1, 1941—The Denison Manufacturing Company has announced a wage and salary bonus for 1941 to all employees on the payroll prior to July 1, including those in the factories at Framingham, Marlboro and Chicago, the retail stores in Boston, New York and Chicago, and all those in the U. S. sales offices.

Weekly and hourly workers will receive two weeks' pay and salaried employees either one month or one-half month pay, depending on length of service.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks, 1941		Corresponding Weeks, 1940	
October 25	106.5	October 26	85.9
November 1	109.7	November 2	85.6
November 8	104.0	November 9	85.6
November 15	106.5	November 16	84.7
November 22	105.5	November 23	84.7
November 29...(Prelim.)	*107.5*	November 30	84.4

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1940	89.1	84.7	82.3	84.3	90.0	92.1	85.3
1941	85.6	89.7	92.2	96.4	98.9	99.5	94.8

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1940	85.1	81.5	85.5	84.9	80.9	85.6
1941	101.8	99.6	105.2	*105.9*	...	...

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941
Year to Date..	69.8	80.0	82.1	71.4	82.8	86.0	*97.1*
Year Average..	69.9	80.4	79.8	71.5	83.4	85.6	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	62	67	67	70	69	70	69	75	78	82	80	74	72
1937	80	86	86	88	85	77	66	74	69	65	55	45	73
1938	54	60	61	57	58	56	57	66	66	70	65	59	61
1939	60	67	71	69	64	67	63	72	74	84	81	71	70
1940	71	70	69	70	76	79	72	74	72	79	77	71	73
1941	75	81	82	83	84	88	86	94	94	99	*98*	..	..

Week ending Oct. 25, 1941—100
Week ending Nov. 1, 1941— 99
Week ending Nov. 8, 1941— 97
Week ending Nov. 15, 1941— 99
Week ending Nov. 22, 1941— 96
Week ending Nov. 29, 1941—*101*

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

Company Must Reinstate Employees

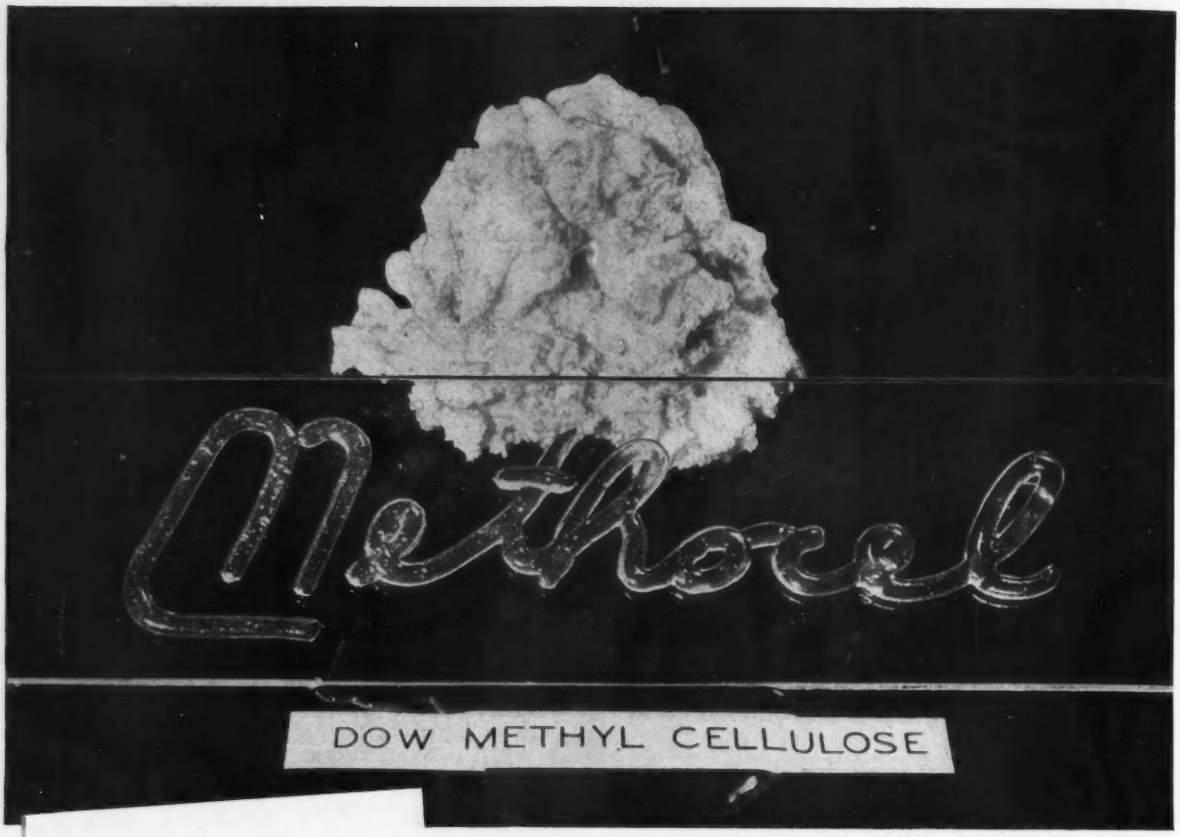
[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 8, 1941—The National Labor Relations Board has announced a decision directing the Brown Paper Mill Company, Inc., Monroe, La. to cease discouraging membership in International Brotherhood of Paper Makers, (AFL), or any other labor organization, by discharging members from company employ because of their union activities.

The company was also directed to cease discharging, laying off or refusing to reinstate employees because they have given testimony under the National Labor Relations Act in a previous unfair labor practice case against the company, which was subsequently upheld by the Courts.

In order to remedy the discrimination against them, nine employees were directed to be reinstated with back pay. The Board found that the nine employees were discharged and refused reinstatement because of their activity in aiding the union during its membership drive among the company's employees. The Board also found that four of these employees were discriminated against for the further reason that they gave testimony under the Act during a February 1938 Board hearing.

Upon charges filed by the International Brotherhood of Paper Makers, (AFL), the Board issued its complaint on November 16, 1940. A public hearing was held at Monroe from Decémber 2-10, 1940, and January 7-10, 1941, before Trial Examiner W. P. Webb. He issued his Intermediate Report on April 30, finding that the company had engaged in unfair labor practices, and recommending dismissal of the complaint as to one employee. Oral argument was held in Washington on July 22, 1941.



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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Mechanism of the Chlorination of Lignin

By E. V. White[1], J. N. Swartz[2], Q. P. Peniston[3], H. Schwartz[4], Joseph L. McCarthy[5] and Harold Hibbert[6]

Abstract

Literature information relating to the equilibrium and self-decomposition reactions of aqueous solutions of chlorine is reviewed, and experimental data are presented indicating that the self-decomposition process can be treated as a second order internal oxidation reaction.

A general concept is developed of the reactions involved in the mechanism of halogenation of lignin and the bleaching of wood pulp. With isolated alkali lignin, treatment with chlorine in aqueous solution results in almost equivalent chlorination and demethoxylation and to a degree which increases with increase in the amount of chlorine added and also with the acidity of the reaction mixture. Literature is cited indicating that most, if not all, methoxyl groupings in lignin are probably attached to guaiacyl nuclei, and that the halogenation of such a nucleus should occur in either the 6- or the 5-position depending upon whether the para-hydroxyl groupings of the nuclei are free. The experimental results are interpreted as indicating that guaiacyl nuclei in lignin are chlorinated in either the 5- or the 6-positions, that the presence of such chlorine atoms induces instability in the methoxyl groupings, and that the methoxyl groupings then cleave with formation of quinone or diketo structures which can further cleave to yield acidic groupings in the lignin.

In additional experiments it is shown that the rate of chlorine consumption by lignosulphonic acid can be treated satisfactorily by assuming that the whole process involves two major reactions, an initial rapid one and a slow time-determining second order one. The slow reaction, it is suggested, is one essentially of an oxidation type in view of its similarity to the second order internal oxidation reaction of self-decomposition of bleaching liquor. The rapid initial reaction is shown to be one of chlorination and demethoxylation as evidenced in the correlation found between the rate of chlorine consumption and the rate of introduction of chlorine and accompanying loss of methoxyl by the lignin.

Experiments are described, the results of which indicate that during aqueous acidic chlorination of unbleached pulp, little lignin is removed, although it is made potentially soluble in alkaline solution presumably as a result of formation of carboxyl groupings arising at points in the lignin from which methoxyl was cleaved. The removal of chlorinated lignin from pulp is indicated to be largely a physical process in which such factors as temperature and time of treatment control the degree of solution of the lignin into the alkaline medium.

Since chlorine was first used by A. Payen in 1839 to delignify plant tissue, an enormous amount of experimental work has been carried out in an attempt to understand better the mechanism of the reactions involved. Because of la of knowledge of the chemical structure of ligni and its relationship to the carbohydrates in the tissue, as well as of the inherent complexity of aqueous solutions of chlorine, progress has been slow.

A. Composition of Aqueous Solutions of Cl

When chlorine gas dissolves in water a reversible hydrolysis occurs:

$$Cl_2 + H_2O \rightleftarrows H^+ + Cl^- + HOCl \qquad (1)$$

and Silov and Kubinskaja *(1)* have recently shown by conductimetric methods that the rate of readjustment of this equilibrium is extremely rapid, being completed in less than 2 minutes and practically reached in 1 minute when a concentrated solution of chlorine is diluted with water at 0 deg. C. The hydrolysis constant of this equilibrium was shown by Jakowkin *(2)* to be represented as follows at 25 deg. C.:

$$K = \frac{(H^+)\ (Cl^-)\ (HOCl)}{(Cl_2)} = (4.84)\ (10^{-4}) \qquad (2)$$

From this value it is possible to calculate the amounts of the several constituents, and the acidity of the solution, when increasing amounts of chlorine are dissolved in water. This has been done by well known methods and the results given in Table I show

TABLE I.—THEORETICAL VARIATION IN COMPOSITION AND pH OF CHLORINE WATER WITH CONCENTRATION

pH	Total Chlorine Concentration	Composition of Solution (mole %)		
		Cl_2	HOCl	Cl^-
1.12	1	92.9	7.1	7.1
1.45	1×10^{-1}	73.8	26.2	26.2
1.78	1×10^{-2}	37.8	62.2	62.2
2.12	1×10^{-3}	11.5	88.5	88.5
2.45	1×10^{-4}	2.8	97.2	97.2
2.78	1×10^{-5}	0.5	99.5	99.5
3.12	1×10^{-6}	0.2	99.8	99.8
3.82	1×10^{-7}	0.1-	99.9+	99.9+

T = 25°C.; chlorine gas in distilled water

[1] University of Idaho, Moscow, Idaho.
[2] Member TAPPI, Howard Smith Paper Mills, Ltd., Cornwall, Ont.
[3] Corn Products Refining Co., Argo, Ill.
[4] Forest Products Laboratories, Ottawa, Ont.
[5] Member TAPPI, Department of Chemistry, University of Washington, Seattle, Wash.
[6] Member TAPPI, Professor of Industrial and Cellulose Chemistry, McGill University, Montreal, Que.

that hypochlorous acid and molecular chlorine are the major and minor constituents, respectively, of such solutions. Only when the saturation point is reached—i.e., 6.4 grams per liter or 0.18 *N* in an open vessel at 25 deg. C. *(3)*—does the molar percentage of chlorine begin to exceed that of hypochlorous acid.

The major constituent of such solutions, hypochlorous acid, can ionize:

$$HOCl \rightleftarrows H^+ + OCl^- \qquad (3)$$

and numerous evaluations of this ionization constant have been made. For example, Davidson *(4)* has found the following value at 18 deg. C.:

$$K = \frac{(H)\ (OCl^-)}{(HOCl)} = (3.7)(10^{-8}) \qquad (4)$$

As an ionic reaction it can be presumed that the rate of readjustment is extremely rapid.

It is apparent that the relative amounts of molecular chlorine, hypochlorous acid, and hypochlorite ions existing in a given solution are markedly dependent upon the acidity of the solution. The composition at various pH values of a solution, typical of those used in the experiments carried out in the present work, has been calculated approximately *(5)* by the simultaneous solution of Equations 2 and 4. The estimated

TABLE II.—THEORETICAL VARIATIONS IN COMPOSITION OF AQUEOUS SOLUTIONS OF CHLORINE WITH pH

	Composition of Solution (mole %)			
pH	Cl_2	HOCl	OCl^-	Cl^-
2	49.1	50.9	...	193
3	7.5	92.5	...	166
4	0.5	99.5	...	157
5	...	99.5	0.4	155
6	...	96.5	3.6	152
7	...	72.2	27.0	138
8	...	21.2	78.6	118
9.5	...	0.9	99.0	109
11	...	0.1	99.9	107

Temperature, 25° C.; concentration, 0.0225*M*; HCl(H^+, Cl^-) or NaOH (OH^-) added to adjust pH of solution.

values, shown in Table II and Fig. 1, and similar to those obtained by Hisey and Koon *(6)*, were computed by assuming that the total concentration of chlorine is 0.1 *N*, and that sulphuric acid or sodium hydroxide is added for the pH adjustment. It is apparent that molecular chlorine predominates only below pH 2, hypochlorous between pH 2 and pH 7.5, and hypochlorite ions above pH 7.5. Worthy of note is the fact that even at pH 1, nearly 20% of the total chlorine is still present as hypochlorous acid. When hydrochloric acid, instead of sulphuric, is used to adjust the pH value, approximately similar results are obtained, although obviously in this case account must be taken of the additional chloride added *(5)*.

The aqueous solutions of chlorine used in the present research were prepared in most cases by the Taylor and Bostock method *(7)* of distilling bleaching powder solutions with boric acid. However, for the reactions at pH 2 a chlorine water solution was used. The chlorine concentration present in the solutions was determined in the usual way by means of adding a volumetric sample to acidified potassium iodide solution and titrating the liberated iodine with standard sodium thiosulphate solution using starch as indicator.

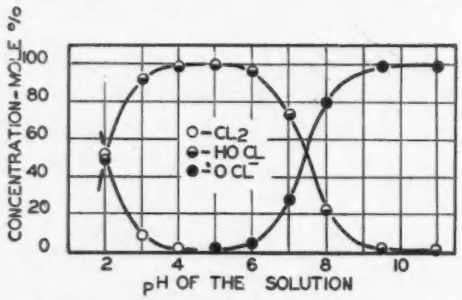

FIG. 1
Composition of Aqueous Solutions of Chlorine at Various pH Values

Solutions prepared by the Taylor and Bostock method are characterized by being free from chloride ions, because bleaching powder solutions buffered with boric acid in the slightly acid range consist very largely of hypochlorous acid which is distilled along with water, the chloride ion being left behind in the distillation liquid. Thus an aqueous solution of hypochlorous acid is obtained which contains practically no chloride ions and is relatively stable towards decomposition. The composition of the aqueous solutions used in the chlorinating reactions is actually more closely approximated by the percentages given in Table II and Fig. 1 rather than by asuming it to be solely hypochlorous acid; on the one hand, because in most cases some hydrochloric acid was used to adjust the initial pH of the solution to the desired value, and on the other, because considerable amounts of hydrochloric acid are formed during the chlorination reaction.

B. Decomposition of Aqueous Solutions of Cl

For more than 100 years it has been known that, on standing, aqueous solutions of chlorine undergo a decrease in active chlorine content. This change is associated with chlorate formation, oxygen liberation, or both. Chlorate formation is slow in alkaline solution but rather rapid in neutral or acid solution, while evolution of oxygen occurs, particularly in neutral solution under the influence of heavy metals or photolysis.

The most investigated case of self decomposition is that of sodium hypochlorite or alkaline solutions of bleaching liquor into chlorate. This was perhaps first observed by Gay-Lussac in 1830 but from Foerster and Dolch's intensive studies *(8)*, it was found that the major reaction of chlorate formation proceeds according to the empirical equation:

$$3\ NaClO \longrightarrow NaClO_3 + 2\ NaCl$$

although a small amount of oxygen is formed as a side reaction:

$$2\ NaClO \longrightarrow O_2 + 2\ NaCl$$

In agreement with Clarens *(9)* they found low concentrations of chlorite present in the reaction mixture. Foerster and Dolch *(8)* observed that in weak alkali (0.1 and 0.5 *N* NaOH) the process was satisfactorily described as one of the second order, although in stronger caustic (2.0 *N* NaOH) fair agreement with a first order process was shown. Kauffman *(10)* has recently established the second order process although Chapin *(11)* under various differing conditions sometimes found agreement with the third order process. Since a second order equation described the reaction, Foerster and Dolch concluded that probably a slower time-determining second order reaction such as:

$$NaOCl + NaOCl \rightarrow NaClO_2 + NaCl$$

might first occur and then be followed by a rapid subsequent reaction:

$$NaOCl + NaClO_2 \rightarrow NaClO_3 + NaCl$$

While chlorite, alone, was stable, they found that the second reaction actually occurred according to the

equation and was in experimental agreement with a second order velocity constant (0.1 to 1.0 *N* NaOH). Thus the rate-determining equation would be:

$$\frac{-d\,(OCl^-)}{dt} = K_2(OCl^-)^2$$

Whereas these results were obtained in alkaline solutions, Chapin *(11)* studied the rate of decomposition at various pH values. He found the rate of decomposition least in (a) acidic solutions and (b) at approximately pH 13, and greatest in neutral solution and above pH 13. No uniform equation could be developed for the results since at pH 6.5 and 0 deg. C. the process appeared to be third order; at 37.5 deg. C. it was intermediate between second and third, and at pH 10 and 80 deg. C. the first order equation fitted best. Foerster and Jorre *(12)* and Foerster *(13)*, under conditions not involving catalysis, found chlorate formation in neutral and acid solutions to be very rapid and in accordance with the following equations:

$$NaClO + 2\,HOCl \rightarrow NaClO_3 + 2\,HCl \text{ (time determining)}$$
$$2\,NaClO + 2\,HCl \rightarrow 2\,HOCl + 2\,NaCl \text{ (very rapid)}$$

They believed that as HOCl was consumed, it was immediately replaced from OCl^- as long as the hydrogen ion remained constant, so that the rate of change of hypochlorite into chlorate was formulated as

$$\frac{-d\,(OCl^-)}{dt} = K(OCl^-)\,(HOCl)^2$$

and since HOCl was considered as constant

$$\frac{-d\,(OCl^-)}{dt} = K'(OCl^-)$$

So long as the concentration of hypochlorite was not too high, the process was apparently one of the first order; at constant pH, the value of *K* was proportional to the square of the concentration of HOCl—i.e., two moles must interact for each mole of hypochlorite. Foerster and Dolch *(8)* studied the reaction further without being able to reach definite conclusions.

Several attempts have been made to take into account the two typical self-decomposition reactions and to devise general equations for the rate of decomposition. Weiss *(14, 15)* developed such a second order equation by means of which the rate of the decomposition at various pH values was expressed; it was found satisfactorily applicable to the results of Foerster and Dolch *(8)* and to those of Kauffmann *(10)*. Skrabal and co-workers *(16, 17)* have studied the kinetics of the decomposition of the halogens and recently Skrabal *(18)* has proposed a single time law governing the rate of formation of XO_3 (X = Cl, Br,I). Skrabal concluded that, in general, the second and the third order reaction rates represent limiting cases and that usually an experimental result falls in between these but may approach one or the other depending upon the conditions of the investigation. Liebhafsky and Makower *(19)* studied the decomposition of solutions of hypobromous acid and noted their similarities with hypochlorites.

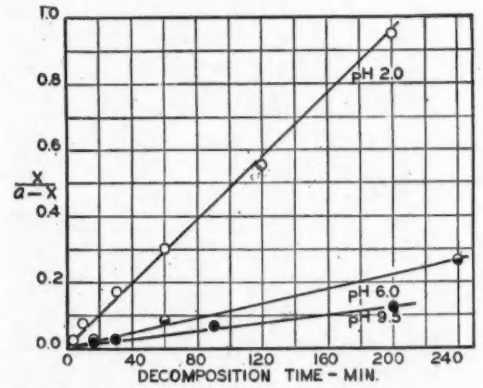

FIG. 2

Second Order Reaction Curves Showing Decomposition of Aqueous Solutions of Chlorine at Various pH Values

Thus the complexities of halogen self decomposition are still not well understood. However, whatever the mechanisms may be, it is evident that basically the changes involve transfer of oxygen

$$HOCl\ (O) \begin{cases} \rightarrow O_2 \\ \rightarrow ClO_3^- \\ \rightarrow \text{Organic "acceptor"} \end{cases}$$

and that the oxygen apparently either reacts (a) with the reagent to form chlorate; (b) with itself to form molecular oxygen; or (c) unites with a proper "acceptor," inorganic or organic.

Thus with the complexities of aqueous solutions of chlorine in mind, and since no clear evidence could be obtained from the literature as to the rate of the decomposition reaction, it was decided to determine the rate of decomposition at various pH values under reaction conditions similar to those used in the treatment of lignin. To this end bleaching liquor samples prepared by dissolving chlorine in aqueous sodium hydroxide were diluted with distilled water to about 2.5 milliequivalents per liter adjusted to the desired pH values and buffered to maintain these values. These solutions were allowed to stand and then were analyzed at appropriate intervals for active chlorine.

The data so obtained at pH 2, 6 and 10 are shown in Table III. These were treated according to well known kinetic methods *(20)*, and it was found that they fitted satisfactorily only into a second order reaction equation as shown by the factor $x/(a-x)$ *vs* time of reaction (Fig. 2). While the constancy of reaction velocity constant *K* (Table III) is certainly not all that could be desired, it is apparent that

TABLE III.—RATE OF SELF-DECOMPOSITION OF BLEACHING LIQUOR[1]

	Time min.	$a-x$ millieq. per liter	x millieq. per liter	$\frac{x}{a-x}$	K
pH 2.0 (unbuffered)	0	2.48	0.00	....	.....
	4	2.42	0.06	0.025	(0.0025)
	10	2.31	0.17	0.074	(0.0030)
	30	2.12	0.36	0.170	0.0023
	60	1.91	0.57	0.30	0.0020
	120	1.60	0.88	0.55	0.0018
	200	1.27	1.21	0.95	0.0019
				$K_{ave.}$	0.002
pH 6.0 (0.1 molar K_2HPO_4)	0	2.48	0.00	....	.....
	4	2.44	0.04	0.016	(0.00016)
	16	2.35	0.13	0.055	(0.00014)
	60	2.29	0.19	0.083	0.00056
	240	1.96	0.52	0.265	0.00045
				$K_{ave.}$	0.0005
pH 9.5 (0.05 molar H_3BO_3)	0	2.48	0.00	....	.....
	4	2.45	0.03	0.012	(0.0012)
	16	2.43	0.05	0.021	(0.00053)
	30	2.41	0.07	0.029	0.00039
	90	2.33	0.15	0.064	0.00029
	200	2.21	0.27	0.122	0.00025
				$K_{ave.}$	0.0003

[1] Bleaching liquor at ca. 21.7 g. per l. diluted to a total volume of 275 cc. 23 ± 1°C.

under the conditions investigated the self-decomposition reaction can be considered as following the second order velocity law. The importance of this relationship will become apparent later.

C. Chlorination and Demethylation of Lignin

It has long been known that lignin can take up chlorine to a degree depending somewhat upon the amount supplied. Most previous experimental work has been carried out in the presence of an excess of chlorine, whereby the lignin is rapidly chlorinated to an extent approaching saturation. Under such conditions no opportunity is provided for observation of intermediate changes which may occur.

With these aspects in mind, White *(21)* carried out a series of experiments in which carefully prepared and purified alkali lignin from spruce wood was treated in various experiments at different pH conditions with successively increasing amounts of chlorine in aqueous solution. With the pH maintained constant in each experiment, the reaction was allowed to proceed at 23 to 25 deg. C. until all of the added active chlorine was consumed. The chlorinated lignins were recovered by precipitation with acid, purified, and then analyzed for yield, methoxyl and chlorine contents. The data are given in Table IV and Figs. 3 and 4.

Examination of the chlorination-demethoxylation data in Figs. 3 and 4 indicates that on chlorination alkali lignin undergoes simultaneous demethylation and chlorination, phenomena previously considered by Freudenberg *(22)*, Friedrich *(23)*, Harris *(24)*, and their respective co-workers. It is thus shown that these two changes proceed in close correlation with one another and to a degree which is markedly influenced by the amount of chlorine reacting and the

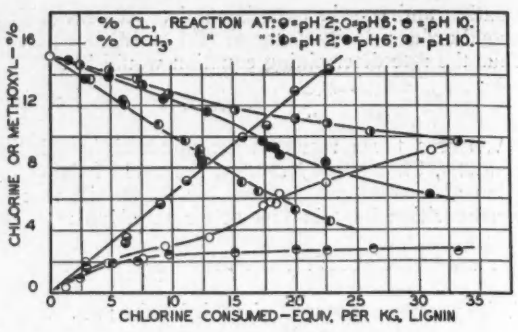

FIG. 3

Effect of Amount of Chlorine Consumed and pH of Chlorination upon the Methoxyl and Chlorine Content of Chlorinated Alkali Lignins

pH of the reaction mixture. Similar results have been obtained with an isolated lignosulphonic acid by Swartz *(25)*, an isolated kraft lignin by Schwartz *(26)*, and with the residual lignin in unbleached soda and sulphate pulps by Peniston *(27)*.

Fundamental consideration of these phenomena demands some conception of the types of linkages by means of which chlorine and methoxyl groupings are combined with lignin and recent developments in lignin chemistry now make it possible to supply a probable explanation.

An insight into the demethoxylation process can best be gained by first studying the mode of attachment of the methoxyl groupings present in identified

TABLE IV.—SUMMARY OF DATA RELATING TO THE CHLORINATION OF ALKALI LIGNIN

Expt.	"Active Cl" consumed per kg. lignin equiv.	Chlorinated Lignins			Calculated Relationships					
					Chlorine		Methoxyl			
		Yield wt. %	OCH_3 %	Cl %	Chlorine bound equiv.	Chlorine bound per Cl consumed	OCH_3 bound equiv.	OCH_3 loss equiv.	OCH_3 loss per Cl bound	OCH_3 loss per Cl consumed
Purified alkali lignin	...	...	15.20	...	....	....	4.91	...	...	....
					pH 2.0					
1	3.02	97	13.75	1.59	0.449	0.149	4.44	0.47	1.05	0.156
2	2.88	108	13.70	1.98	0.563	0.195	4.45	0.46	0.82	0.160
3	6.01	108	12.25	3.18	0.900	0.150	3.95	0.96	1.05	0.159
4	6.15	97	12.00	3.41	0.965	0.157	3.88	1.03	1.07	0.168
5	8.97	99	10.70	5.60	1.60	0.178	3.49	1.42	0.89	0.158
6	11.1	99	9.61	7.09	2.03	0.183	3.15	1.76	0.87	0.158
7	12.2	103	9.08	8.18	2.36	0.193	3.00	1.91	0.81	0.157
8	12.2	92	8.77	8.41	2.43	0.199	2.90	2.01	0.83	0.165
9	15.7	95	7.09	9.92	2.86	0.182	2.34	2.57	0.90	0.164
10	17.0	92	6.41	10.76	3.11	0.183	2.12	2.79	0.90	0.164
11	20.0	97	5.30	12.97	3.79	0.189	1.77	3.14	0.83	0.157
12	22.8	77	4.46	14.37	4.23	0.186	1.49	3.42	0.81	0.150
					pH 4.0					
13	7.38	88	12.20	4.86	1.40	0.190	4.04	0.87	0.62	0.118
14	10.97	84	10.85	6.43	1.84	0.168	3.29	1.62	0.83	0.148
15	14.50	77	9.25	9.00	2.63	0.181	3.09	1.82	0.72	0.126
16	18.40	77	7.74	10.40	3.04	0.165	2.59	2.32	0.76	0.139
					pH 6.0					
17	1.6	108	14.82	0.38	0.107	0.067	4.79	0.12	1.12	0.075
18	4.8	102	13.85	1.85	0.525	0.109	4.51	0.40	0.76	0.083
19	9.4	104	12.70	2.94	0.835	0.089	4.12	0.79	0.94	0.084
20	12.9	104	11.60	3.58	1.01	0.078	3.75	1.16	1.05	0.090
21	17.4	82	9.70	5.55	1.57	0.090	3.10	1.81	1.05	0.104
22	18.0	77	9.36	5.65	1.59	0.088	3.02	1.89	1.19	0.105
23	18.2	69	9.35	5.65	1.59	0.087	3.01	1.90	1.19	0.104
24	18.7	65	8.78	6.26	1.76	0.094	2.83	2.08	1.17	0.112
25	22.4	64	8.32	7.01	1.97	0.088	2.69	2.22	1.12	0.099
26	31.0	56	6.28	9.11	2.56	0.083	2.04	2.87	1.11	0.093
					pH 8.0					
27	15.4	96	11.38	2.94	0.821	0.053	3.62	1.29	1.57	0.084
28	20.0	68	10.40	3.72	1.04	0.052	3.31	1.60	1.56	0.080
29	24.2	58	9.60	3.62	1.00	0.041	3.03	1.88	1.88	0.078
30	30.0	38	8.88	4.64	1.29	0.043	2.81	2.10	1.63	0.070
					pH 10.0					
31	2.46	111	14.62	0.88	0.249	0.101	4.73	0.18	0.72	0.073
32	4.86	105	14.21	1.88	0.536	0.110	4.64	0.27	0.50	0.055
33	7.12	98	13.70	2.00	0.566	0.080	4.43	0.48	0.85	0.066
34	7.34	98	13.38	2.02	0.570	0.078	4.32	0.59	1.04	0.080
35	9.58	108	12.75	2.40	0.677	0.071	4.11	0.80	1.18	0.084
36	15.16	96	11.75	2.50	0.695	0.046	3.75	1.16	1.67	0.077
37	20.0	77	11.09	2.67	0.740	0.037	3.51	1.40	1.90	0.070
38	22.6	96	10.84	2.63	0.725	0.032	3.44	1.47	2.03	0.065
39	26.2	69	10.30	2.76	0.761	0.029	3.25	1.66	2.18	0.063
40	33.2	54	9.65	2.59	0.709	0.021	3.03	1.88	2.65	0.057

degradation products of lignin and the yields of the latter. Based upon the weight of Klason lignin in spruce wood, Freudenberg and co-workers *(28)*, in work confirmed by the authors *(29)*, have shown that a yield of about 25% of vanillin, a substance containing the guaiacyl grouping, can be obtained. Prior to this, certain important ethanolysis products, containing guaiacyl nuclei had been isolated by Hibbert and co-workers *(30, 31)* in yields amounting to 5 to 10% of the Klason lignin in wood. Hydrogenation of lignin *(32, 33, 34)* at high pressures converts about 30 to 40% into propyl derivatives of cyclohexane and cyclohexanol. That the cyclohexyl nuclei of these hydrogenation products are actually formed from guaiacyl nuclei present in spruce wool lignin has been shown *(32)* by the conversion, in high yield, of certain ethanolysis products *(30)* by means of the high-pressure hydrogenation technique into the same propyl cyclohexanol derivatives as are obtained from lignin by direct hydrogenation. Since no additional methoxyl containing substances have been isolated from spruce lignin, it seems allowable, tentatively, to accept the concept that most, if not all, of the methoxyl groupings of spruce lignin are present as phenolic ethers, probably of the guaiacyl type.

It thus becomes of interest to consider the behavior on halogenation of some model-type compounds containing this and related nuclei. Study of the literature reveals that the location of the initial halogen substitute is determined by whether or not the para-hydroxyl grouping on the guaiacyl nucleus is free. Chlorination occurs on the 5-position when the *p*-hydroxyl is free, as in the case of vanillin *(35, 36, 25)*, *p*-creosol *(37)*, and protocatechuic aldehyde *(38)*. When this is blocked, as in the case of acyl vanillin derivatives *(40, 39)*, veratraldehyde *(38)*, methylveratrate *(41)*, homoveratric acid *(38)*, methoxy creosol *(41)*, isovanillin *(42)* and piperonal *(37, 43)*, substitution of halogen takes place in the 6-position. Recently definite and valuable evidence in this connection has been obtained in Freudenberg's

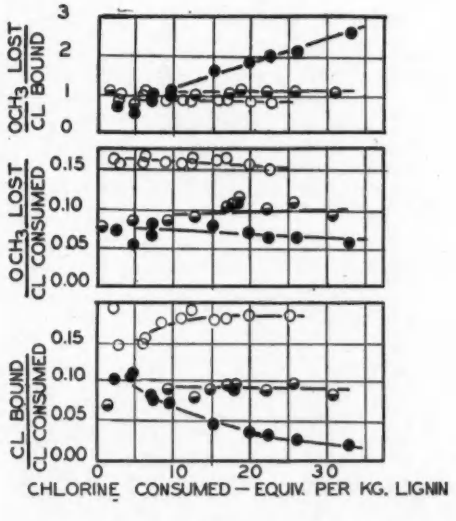
OCH3 LOST / CL BOUND
OCH3 LOST / CL CONSUMED
CL BOUND / CL CONSUMED
CHLORINE CONSUMED — EQUIV. PER KG. LIGNIN
REACTION AT: O = pH 2; ⊖ = pH 6; ● = pH 10.

FIG. 4

Effect of Amount of Chlorine Consumed and pH of Chlorination on Methoxyl and Chlorine Relationships with Alkali Lignin

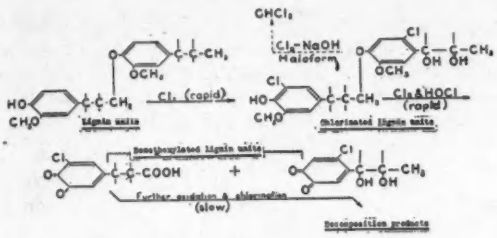

FIG. 5

Schematic Representation of Chlorination-Demethoxylation Reactions of Lignin

laboratory by Lautsch and Piazolo *(44)* by subjecting a brominated, extracted spruce lignin to a combined oxidation-alkaline cleavage, from the reaction product of which 6-bromovanillin was isolated in a yield of 8% calculated on the initial isolated lignin. This proves that halogens enter the aromatic nuclei and, to a considerable extent, in the 6-position, and indicates that in extracted lignins some of the *para*-hydroxyl groups are not free and must be combined with one another through that position. A more complete understanding of these relationships must await the isolation of chlorinated derivatives in higher yields, and it can be anticipated that such products will prove to be mixtures consisting of the 6-derivative with smaller amounts of the 5-substituent in view of the presence of free hydroxyl groups in lignosulphonic acid as demonstrated by the methylation-alkaline cleavage experiments of Tomlinson and Hibbert *(45)*.

Halogenated guaiacyl derivatives are known to lose methoxyl groupings under certain halogenating and oxidizing conditions. Qvist *(46)* treated creosol with chlorine in dry glacial acetic acid at 100 deg. C. in the dark and obtained a 44% yield of hexachloromethyl diketodihydrobenzene. Raiford and Oberst *(47)* have shown that cleavage of the methylene dioxide (as well as the aldehyde) grouping occurs when 6-bromopiperonal is treated with bromine at 100 deg. C. in the presence of aluminum tribromide. Oxidation cleavage has been observed by Cousin *(48)* who prepared tetrachloro-orthobenzoquinone by means of nitric acid oxidation of tetrachloroguaiacol and also tetrachloroveratrol. Freudenberg *(22)* has shown that 5-bromovanillic acid loses methoxyl groupings when brominated in aqueous acidic solution. From the work of Qvist *(46)* and Cousin *(48)* the groupings originating by cleavage of methoxyl from guaiacyl nuclei are apparently quinones or diketo-derivatives and in the presence of oxidizing agents such as the hypochlorous acid in aqueous solution of chlorine may cleave to give dicarboxylic acids and further degradation products *(49, 50)*.

Based on this literature evidence the major chlorination and demethylation changes observed to take place in the present experimental work on halogenation of lignin are interpreted by the authors as shown in Fig. 5.

In the experiments described above, the remarkably close interrelationship (Fig. 3) between loss in methoxyl and gain in chlorine groupings may be regarded as evidence for the occurrence of these reactions on a guaiacyl nucleus, since the calculated ratios of the molar equivalent of methoxyl lost and chlorine

found (Table IV, Fig. 4), obtained roughly by correcting the experimental values, in most cases approximate unity. Perhaps the key to the mechanism of cleavage of methoxyl groups, as well as to the whole process of delignification of lignified tissue with chlorine, may be found in the observed correlation (Fig. 3) between the pH of the chlorinating mixture and the extent of the demethoxylation changes which are found to be greatest in acid, smaller in neutral and least in alkaline solution. This variation is seen to be in marked correlation with the change in concentration of molecular chlorine present in the reaction mixture (Fig. 1), and thus suggests that demethoxylation is due, at least in part, to the primary action of molecular chlorine on phenols and derivatives. This "primary function" was first indicated in the earlier work of Soper and Smith *(51)* on the action of chlorine and hypochlorous acid on phenols, and confirmed later by Hibbert and Taylor *(52)* using phenols, phenolic substances, and lignin. However, in view of other findings that methoxyl groupings can be removed from lignin by oxidation reaction with reagents such as ozone *(53)*, it is possible that oxidation cleavage by hypochlorous acid may contribute to the methoxyl loss, perhaps most extensively in alkaline solution. Removal of methoxyl groupings probably leaves more or less unstable carboxyl and quinone groupings *(46, 48)* present in the lignin rather than a replacement by new hydroxyls since it appears *(21)* that the number of such dimethyl sulphate methylatable hydroxyl groups is left nearly unchanged by the treatment. Probably the extent to which subsequent oxidation processes proceed determines the number and nature of the final groupings. Also during chlorination in aqueous solution, the oxypropyl side-chains attached to the guaiacyl nuclei in lignin *(30, 31, 32, 33, 34)* probably undergo halogenation, cleavage, and oxidation in such a manner as to affect the final constituents present in the lignin. It is possible that the haloform reaction products from lignin *(24, 54)* may arise from the side-chains of the unethoxylated precursor of the ethanolysis product, α-ethoxypropiovanillone *(30, 31)*, as shown in Fig. 5.

D. Rate of Chlorination and Demethylation

With a reasonably complete picture thus outlined of the progressive chlorination and demethylation reactions, and the effect of pH of the reaction mixture on these, it became of interest to consider the rates at which these reactions proceed.

To this end, Swartz *(25)* treated lignosulphonic acid in aqueous solution with appropriate amounts of an aqueous solution of chlorine buffered to pH values of 2, 4, 6, 8, and 10, respectively. Samples of the active chlorine content of the reaction mixtures were taken every few minutes during the first hour, then less frequently and determined by the methods given above. In Table V the values of this for the different solutions, at various periods of time are given and are plotted against the logarithm of elapsed time (Fig. 6).

It is immediately apparent that the reaction is characterized by a rapid consumption of chlorine during the first few minutes, as found with phenols *(51, 52)* and long recognized in bleaching practice. Thereafter, in agreement with the results of Curran and Baird *(55)*, Yorston *(56)*, and Hisey and Koon *(6)*, the chlorine content decreases roughly in proportion to

TABLE V.—REACTION RATE OF LIGNOSULPHONIC ACID

Time min.	$a-x$ m. eq./l.	x m. eq./l.	$\frac{x}{a-x}$	x' m. eq./l.	$\frac{x'}{a-x}$	K
			pH 2 [1]			
0	23.3	0	...	...	...	.....
1	4.8	18.5	3.9	1.5	0.31	0.049
4	3.0	20.3	6.8	3.3	1.1	0.044
8	2.4	20.9	8.7	3.9	1.6	0.032
16	2.2	21.1	9.6	4.1	1.8	(0.018)
22	2.1	21.2	10.1	4.2	2.0	(0.014)
37	1.8	21.6	12.0	4.5	2.5	(0.011)
57	1.6	21.7	13.5	4.7	2.9	(0.0081)
110	1.1	22.2	20.2	5.2	4.7	(0.0068)
345	0.5	22.8	45.6	5.8	11.6	(0.0053)
					$K_{ave.}$, ca.	0.04
			pH 4 [2]			
0	26.2	0	...	...	...	.....
1	13.3	12.8	0.96	...	...	.....
3	11.5	14.6	1.27	1.6	0.14	(0.0036)
9	8.4	17.7	2.10	4.7	0.56	0.0048
14	7.0	19.1	2.73	6.1	0.87	0.0047
20	5.9	20.2	3.43	7.2	1.22	0.0047
32	4.3	21.8	5.1	8.8	2.05	0.0049
45	3.3	22.8	6.9	9.8	2.95	0.0049
85	1.3	24.8	19.1	11.8	9.1	(0.0082)
133	0.8	25.3	31.6	12.3	15.4	(0.0088)
303	0.4	25.7	64.2	12.7	31.8	(0.0080)
					$K_{ave.}$	0.005
			pH 6 [3]			
0	25.2	0	...	...	...	.....
3	14.2	11.0	0.72	...	...	.....
8	12.0	13.2	1.10	0.6	...	.....
15	10.4	14.8	1.42	2.2	0.21	0.0011
33	8.5	16.7	1.97	4.1	0.48	0.0012
60	6.7	18.5	2.76	5.9	0.85	0.0011
110	5.1	20.1	3.95	7.5	1.47	0.0011
200	3.3	21.9	6.70	9.3	2.82	0.0011
300	2.2	23.0	10.5	10.4	4.72	0.0012
390	1.15	23.7	20.6	11.4	9.9	(0.0020)
					$K_{ave.}$	0.001
			pH 8 [4]			
0	24.7	0	...	...	...	.....
3	16.8	7.9	0.47	...	...	.....
6	15.8	8.9	0.56	...	...	.....
15	13.9	10.8	0.78	...	...	.....
31	12.0	12.6	1.05	1.0	0.08	(0.00020)
55	10.6	14.1	1.3	2.4	0.23	0.00032
98	8.9	15.8	1.8	3.1	0.35	0.00027
142	7.8	16.9	2.2	5.2	0.67	0.00036
202	6.8	17.9	2.6	6.2	0.91	0.00035
322	5.3	19.3	3.6	7.7	1.45	0.00035
					$K_{ave.}$	0.0003
			pH 10 [5]			
0	25.0	0	...	...	...	.....
2	19.6	5.4	0.27	...	...	.....
9	17.4	7.6	0.44	...	...	.....
16	16.4	8.6	0.52	...	...	.....
28	15.5	9.5	0.61	...	...	.....
38	15.0	10.0	0.67	0.6	0.04	(0.000067)
58	14.1	10.9	0.77	1.5	0.11	0.00012
98	13.1	11.9	0.86	2.5	0.19	0.00012
173	11.9	13.3	1.10	3.7	0.31	0.00012
248	11.1	13.9	1.25	4.5	0.41	0.00011
313	10.5	14.5	1.38	5.1	0.50	0.00010
					$K_{ave.}$	0.0001
			pH 10 [6]			
0	12.3	0	...	...	...	0
1	9.7	2.6	0.27	...	...	.....
9	7.2	5.1	0.71	0.5	...	.....
19	5.9	6.4	1.08	1.8	0.30	0.0020
35	5.1	7.4	1.4	2.6	0.51	0.0019
52	4.5	7.8	1.7	3.2	0.71	0.0018
100	3.3	9.0	2.7	4.4	1.32	0.0017
172	2.5	9.8	3.9	5.2	2.10	0.0016
					$K_{ave.}$	0.002
			pH 10 [7]			
0	6.6	0	...	...	...	.....
2	3.9	2.7	0.69	0.2	...	.....
11	2.1	4.5	2.1	2.0	0.96	0.021
26	1.0	5.6	5.6	3.1	3.1	0.029
40	0.5	6.1	12.2	3.6	7.2	0.044
					$K_{ave.}$	0.03

1. 0.75 g. lignosulphonic acid; 151 cc. of HOCl solution, 559 cc. of pH 2 Clarke and Lubs buffer solution, hydrochloric acid and distilled water, 750 cc. total volume; 23 ± 1° C.
2. 0.75 g. lignosulphonic acid; 195 cc. of HOCl solution, 530 cc. of pH Clarke and Lubs buffer solution; distilled water, 750 cc. total volume; 23 ± 1° C.
3. 0.75 g. lignosulphonic acid; 130 cc. of HOCl solution, 595 cc. of pH 6 Clarke and Lubs buffer solution; distilled water, 750 cc. total volume; 23 ± 1° C.
4. 0.75 g. lignosulphonic acid, 140 cc. of HOCl solution, 585 cc. of pH 8 Clarke and Lubs buffer solution, 750 cc. total volume; 23 ± 1° C.
5. 0.75 g. lignosulphonic acid, 135 cc. of HOCl solution, 590 cc. of pH 10 Clarke and Lubs buffer solution, 750 cc. total volume; 23 ± 1° C.
6. 0.75 g. lignosulphonic acid; 75 cc. of HOCl solution, 650 cc. of pH 10 Clarke and Lubs buffer solution, 750 cc. total volume; 23 ± 1° C.
7. 0.75 g. lignosulphonic acid; 50 cc. of HOCl solution, 675 cc. of pH 10 Clarke and Lubs buffer solution, 750 cc. total volume; 23 ± 1° C.

the logarithm of the elapsed time. The order of the reactions was considered using the usual equations *(20)*, and it was found that only by using the second order equation and plotting the factor $x/(a-x)$ against time could, in general, an approximately straight line be obtained, as shown for the several cases in Fig. 7.

On this curve it is of interest that on extension to zero time, the extrapolated straight line does not pass through the origin as would be expected for a second order reaction. Instead there is an intercept and this phenomenon led to development of the concept, independently put forward at the same time by the authors *(5)* and by Carmody and Mears *(57)*, that in the aqueous reaction between chlorine and lignin, two major changes occur, namely, a "rapid" initial process and a "slow" time-determining second order reaction. The usual differential equation for a second order process is

$$\frac{dx}{dt} = K_2(a-x)^2$$

which can be integrated to

$$K_2 = \frac{1}{t}\,\frac{x}{a(a-x)}$$

and if it be assumed that in the chlorination of lignin two reactions occur, this latter equation can be corrected to allow extrapolation through the origin by means of insertion of the constant Z to give

$$K = \frac{1}{at}\left(\frac{x}{a-x} - Z\right)$$

where:

a = initial active chlorine concentration (milliequivalent per liter).
t = time (minutes).
x = decrease in active chlorine concentration in time t (m.equiv./liter).
$a-x$ = active chlorine concentration at time t (m.equiv./liter).

also:

$Z = \dfrac{x_o}{a-x}$ = graphically evaluated ratio.

$x_o = \dfrac{aZ}{1+Z}$ = calculated active chlorine concentration decrease due to initial rapid reaction (m.equiv./liter).

$a_o = a - x_o$ = calculated initial active chlorine concentration for slow second order reaction. (m.equiv./liter).

x' = calculated active chlorine concentration decrease due to consumption in slow second order reaction in time t.

The second order reaction velocity constant was evaluated by determining Z graphically, then calculating x_o as above, then a_o as the initial active chlorine concentration, and finally x as the active chlorine concentration due to the slow second order reaction at each time; from these K was evaluated as a second order reaction velocity constant. It should be noticed that this method of calculation assumes the initial rapid reaction to occur instantly. Since this is not actually the case, the calculated values of the chlorine consumed in the first few minutes are apparently negative. By disregarding these figures and taking values of K during the later stages of the reaction, reasonably constant values are obtained as shown in Table V.

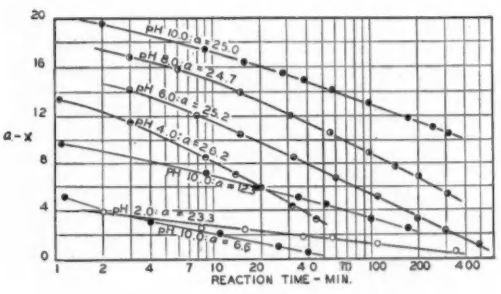

FIG. 6
Rate of Chlorine Consumption of Lignosulphonic Acid

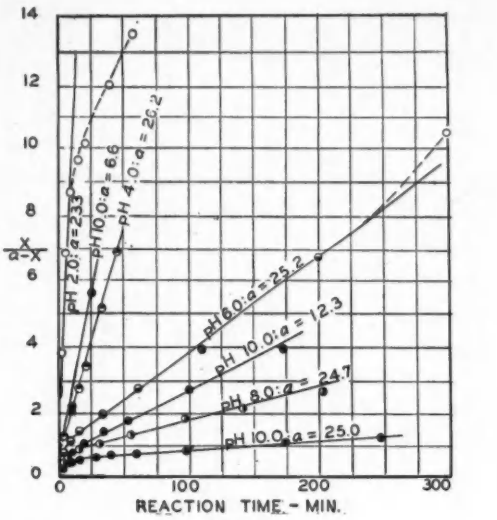

FIG. 7
Second Order Reaction Curves Showing Reaction of Aqueous Solutions of Chlorine with Lignosulphonic Acid at Various pH Values

It is clear from the summarized data in Table VI that the magnitude of K is an important function of the hydrogen ion concentration of the reaction mixture, indicating that the slow second order reaction is fastest in acid solution and decreases in rate as the solution is made neutral and alkaline. It is not clear why the magnitude of the velocity constant increases as the concentration of active chlorine decreases.

This description of the process of chlorine consumption as involving two reactions is of importance because for the first time it indicates the general type of reactions which occur when active chlorine is consumed by lignin.

Referring to Table III and Fig. 2, and comparing this graph of the self decomposition of bleaching

TABLE VI.—SUMMARY OF KINETIC DATA FOR LIGNOSULPHONIC ACID AND AQUEOUS SOLUTIONS OF CHLORINE

pH of Reaction[1]	Active Chlorine Added, g./g.	a m. equiv. per liter	$Z = \frac{x_o}{a-x_o}$	x_o m. equiv. per liter	a_o m. equiv. per liter	Oxidation Reaction K^2	Chlorination Reaction Active chlorine used: Weight g.	Chlorination Reaction Active chlorine used: by L.S.A. g/g.
Lignosulphonic acid								
2.0	0.66	23.3	2.7	17.0	6.3	0.04	0.48	0.64
4.0	0.70	26.2	1.0	13.1	13.1	0.005	0.35	0.46
6.0	0.67	25.2	1.0	12.6	12.6	0.001	0.33	0.44
8.0	0.65	24.7	0.9	11.7	13.0	0.0003	0.31	0.41
10.0	0.66	25.0	0.6	9.4	15.6	0.0001	0.25	0.33
10.0	0.33	12.3	0.6	4.6	7.7	0.002	0.12	0.16
10.0	0.18	6.6	0.6	2.5	4.1	0.03	0.066	0.09
Self decomposition of aqueous solutions of chlorine								
2	...	2.48	..	...	...	0.002	...	...
6	...	2.48	..	...	...	0.0005	...	...
9.5	...	2.48	..	...	...	0.0003	...	...

1. 23 ± 1° C.: total volume = 750 cc.; sample = 0.75 g.; buffered, stirred.

2. $K = \dfrac{1}{at}\left(\dfrac{x}{a-x} - Z\right)$.

liquor with Fig. 7, namely that of the reaction of the liquor with lignosulphonic acid, it is apparent there is a marked similarity both in the amenability of the two to the second order process treatment and also in the effect of pH upon the rate of both reactions. Since it has been indicated above that the self decomposition of bleaching liquor is an internal oxidation reaction, it seems highly probable then that the slow second order phase of the reaction between lignin and bleaching liquor is likewise a reaction of oxidation.

E. Consumption and the Degree of Chlorination

In order to study the nature of the initial chlorine consumption, experiments directed toward the correlation of the rate of reaction between the residual lignin in cellulose pulp and the chlorination and demethylation reactions were carried out upon the lignin present in unbleached sulphate pulp by Peniston *(27)*, Swartz *(25)*, and Schwartz *(26)*. Unbleached sulphate pulp (180 grams; 3.08% Klason lignin) was suspended in water (2% consistency) in some cases buffers being added and then the pH of the suspension adjusted to the desired value. While stirring, an aqueous solution of chlorine at the same desired pH value was added and the consumption of chlorine allowed to proceed until approximately one third, two thirds, or the entire bleach demand of the pulp was consumed. During the progress of these reactions, the chlorine content of the bleaching suspension was determined at frequent intervals by extracting an adequate sample and titrating it in the usual way with standard sodium thiosulfate. The suspension was finally rapidly filtered on a large Büchner funnel, very thoroughly washed with distilled water at 22 to 25 deg. C., then airdried and bottled in preparation for analysis. The resulting samples were analyzed for content of Klason lignin, methoxyl, and chlorine.

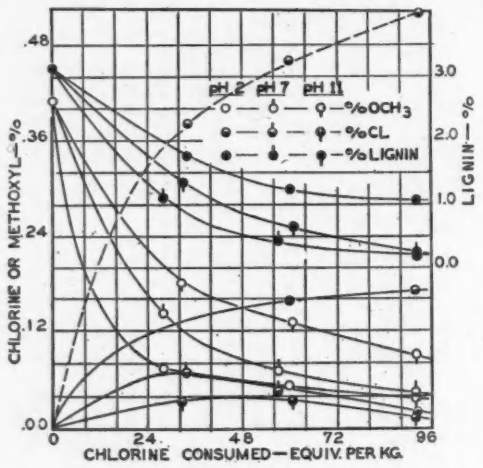

FIG. 8

Effect of Amount of Chlorine Consumed and pH of Chlorination upon the Methoxyl, Chlorine, and Lignin Content of Chlorinated Kraft Pulp

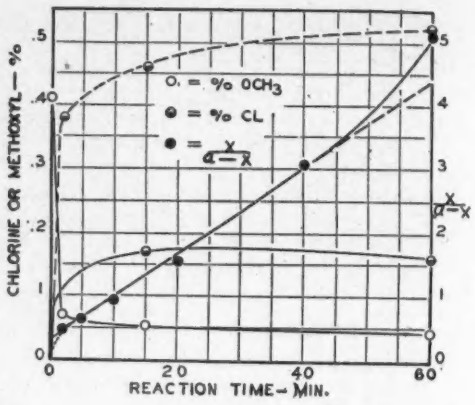

FIG. 9

Correlation between Rate of Reaction and the Chlorination and Demethoxylation of Kraft Pulp at pH 2

Satisfactory duplicate chlorine analyses were difficult to obtain unless the chlorinated samples were first washed well with boiling distilled water, then airdried. Thus, it should be noted in Table VII that while the values for Klason lignin and methoxyl were obtained upon the semibleached samples washed with water at room temperature, the chlorine content with the exception of one indicated series of values at pH (those shown by the broken line in Fig. 9) were determined upon samples washed in addition with boiling distilled water.

From the results shown in Fig. 8, it is clear that the change in lignin, chlorine, and methoxyl content of unbleached sulphate pulp on treatment with aqueous solutions of chlorine at various pH values, is, in general, of the same type as found earlier with soda pulp *(27)*; isolated lignosulphonic acid *(25)*, and the above reported alkali lignin *(21)*. Some difficulty is experienced in the direct interpretation of the results of the Klason lignin determination, but the general trend of the results is clearly confirmatory.

The kinetic data were treated according to the method developed above and on the assumption that

TABLE VII.—SUMMARY OF DATA RELATING TO BLEACHING OF KRAFT PULP

	Chlorination Reaction						Product					
	Chlorine											
	Added		Consumed						Methoxyl		Chlorine	
Sample	% [1]	EPKL [2]	% [1]	EPKL [2]	Reaction Time, min.	pH	Klason Lignin % [1]	Initial Klason Lignin %	% [1]	EPKL [2]	% [1]	EPKL [2]
Unbleached	...	...	...	..	....	...	3.14	..	0.41	4.3	....	...
2-3.3	12.0	110	3.7	34	2	2.0	1.75	56	0.068	1.3	....	...
2-6.7	12.0	110	6.6	60	15	2.0	1.24	40	0.052	1.4	0.159	3.6
2-10.0	12.0	110	10.1	92	60	2.0	1.06	34	0.043	1.3	0.170	4.5
7-3.3	12.0	110	3.1	28	2	7.0	1.11	35	0.14	4.1	0.077	1.95
7-6.7	12.0	110	6.2	57	70	7.0	0.43	14	0.071	5.3	0.047	3.1
7-10.0	12.0	110	10.1	92	600	7.0	0.24	8	0.040	5.4	0.016	1.9
11-3.3	12.0	110	3.6	33	50	11.0	1.35	43	0.18	4.3	0.035	.73
11-6.7	12.0	110	6.6	61	1150	11.0	0.65	21	0.13	6.5	0.035	1.5
11-10.00	12.0	110	10.1	93	9500	11.0	0.25	8	0.085	11	0.021	2.4

[1] % = Percentage based on weight of pulp
[2] EPKL = Equivalents per kilogram of lignin

TABLE VIII.—RATE OF REACTION OF BLEACHING LIQUOR WITH KRAFT PULP

Time min.	$a-x$ % act. Cl_2	x % act. Cl_2	$\frac{x}{a-x}$
	pH 2		
0	12.00	0.00	0.00
2	8.15	3.85	0.47
5	7.40	4.60	0.62
10	6.25	5.75	0.92
20	4.73	7.27	1.54
40	2.96	9.04	3.06
60	1.97	10.03	5.10
			$K_{ave.}$ 0.005
	pH 7		
0	12.00	0.00	0.00
2	8.25	3.75	0.45
5	7.70	4.30	0.56
20	7.10	4.90	0.69
50	6.20	5.80	0.93
100	5.30	6.70	1.26
200	4.10	7.90	1.92
400	3.00	9.00	3.00
500	2.20	9.80	4.45
575	1.90	10.10	5.30
			$K_{ave.}$ 0.0006
	pH 11		
0	12.00	0.00	0.00
5	10.28	1.72	0.17
50	8.40	3.60	0.43
150	7.70	4.30	0.56
300	7.00	5.00	0.71
600	6.28	5.72	0.91
1200	5.25	6.75	1.29
2100	4.40	7.60	1.72
3600	3.65	8.35	2.29
5100	3.15	8.85	2.81
7200	2.50	9.50	3.80
8700	1.95	10.05	5.17
			$K_{ave.}$ 0.00004

two separate major reactions were occurring—i.e., an initial rapid one, and a slower time-determining second order reaction. The resulting graphs of $x/(a-x)$ *vs* time, at pH 2, 7, and 11, in the reaction mixture are given in Figs. 9, 10, 11, respectively. It is apparent that the treatment is equally satisfactory when applied either to the insoluble lignin residue in cellulosic pulp or to the *soluble* lignosulphonic acids, thus refuting the arguments which have often been advanced that the factor controlling the rate of chlorine consumption is that of rate of diffusion or absorption and therefore making it evident that chemical factors are those which control the rate of chlorine consumption.

The correlation between the initial rapid chlorine consumption and the chlorination and demethylation of the lignin is shown in Figs. 9, 10, 11, in which the factor $x/(a-x)$ and the chlorine and methoxyl contents of the sulphate pulps are plotted against time in the cases of aqueous reactions at pH2, 7, and 11, respectively. In Fig. 9, it is apparent that the rate of chlorine consumption is extremely rapid during

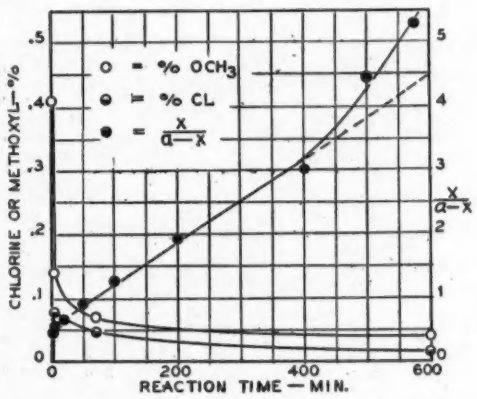

FIG. 10

Correlation between the Rate of Reaction and the Chlorination and Demethoxylation of Kraft Pulp at pH 7

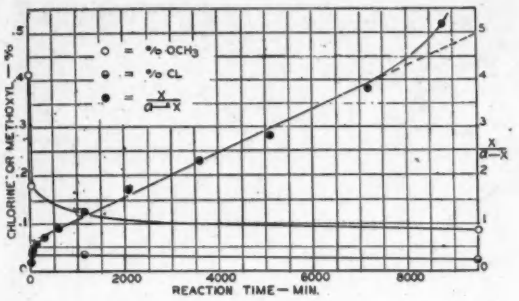

FIG. 11

Correlation between the Rate of Reaction and the Chlorination and Demethoxylation of Kraft Pulp at pH 11

the first few minutes—i.e., during the "fast" reaction —and then the slower second order reaction proceeds as the time-determining one. That the initial rapid reaction is actually one of chlorination and demethylation is proven by the analytical results plotted on the same curve, where it is shown that during the first 2 minutes of the reaction, the chlorine content rises to a value of nearly 0.4% (not washed with hot distilled water; 0.1% Cl if washed), and simultaneously the methoxyl content of the pulp falls from 0.4 to 0.07%. The subsequent minor changes in chlorine and methoxyl content of the lignin in the pulp, as well as the similarity between the rate of reaction between the bleach liquor and unbleached pulp as compared with the rate of decomposition of bleach liquor, very strongly indicate that the slow second order time determining reaction is actually one of oxidation.

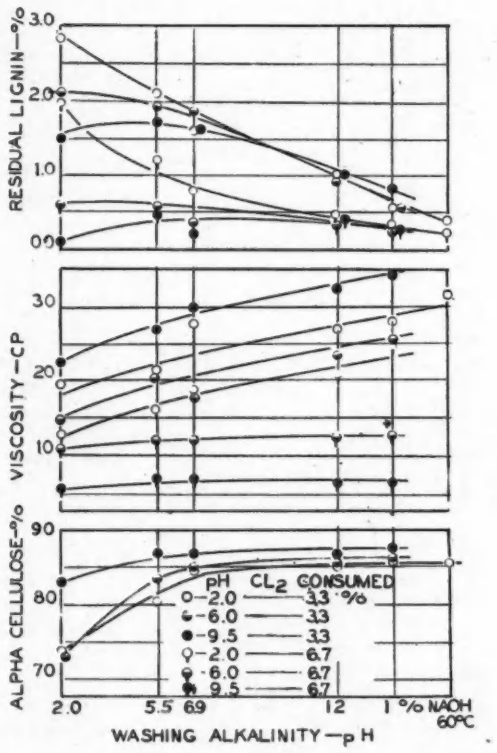

FIG. 12

Effect of Alkalinity of Washing Liquor upon the Characteristics of Kraft Pulp with Various Amounts of Chlorine of Various pH Values

F. Solubility of Chlorinated Pulp Lignin in Aqueous Solution

In view of the above considerations, experiments were carried out in order to ascertain the degree to which chlorinated lignin could be removed from kraft pulp by means of treatment with aqueous solutions at various pH values, temperatures, and for varying lengths of time.

Samples of unbleached kraft pulp, chlorinated to varying degrees in aqueous solution in the manner described above, were washed exhaustively with aqueous solutions at various pH values and then examined for lignin content with the results given in Table IX and Fig. 12.

In another series of experiments, a pulp chlorinated to one third of its bleach demand at pH was divided into several parts, and each one was washed identically with aqueous alkali at pH 12 for varying periods of time. Still another series of tests was carried out using this chlorinated pulp and identical washing at pH 12 except that the temperature of the washing was varied. The products from these two series of treatments were examined for Klason lignin content with the results shown in Tables X and XI and Fig. 13, respectively.

The effect of alkalinity on lignin removal (Fig. 12) is quite marked since even from a pulp treated at pH 2 with only one third of its bleach demand, the residual Klason lignin amounts to 2.8% after washing at pH 2 whereas it is only about 0.5% after treating with 1% NaOH at 60 deg. C. Similar trends are apparent with pulps treated with larger amounts of chlorine, although here the lignin removal is somewhat higher. These results show that by chlorination in an acidic medium the lignin residue in the pulp is made substantially *potentially soluble* in alkali (presumably as a result of successive demethoxylation-quinone formation and quinone cleavage reactions to give acidic groupings which confer the property of alkali solubility on the residual lignin) although only a very small amount of the lignin actually dissolves in the course of the acidic chlorination treatment when the limited amount of chlorine actually necessary is used.

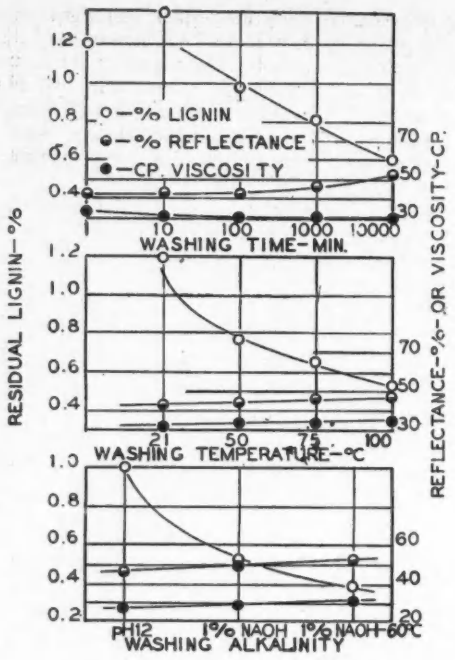

FIG. 13

Effect of Time, Temperature, and Alkalinity in the Washing of Kraft Pulps Chlorinated at pH 2 with 3.3 Per Cent Chlorine

It has been shown above by kinetic measurements that the rate of chlorination is similar with both soluble lignosulphonic acid and insoluble lignin residues in pulp, thus indicating that diffusion of the halogenating reagent plays only a minor part in the

TABLE IX.—SUMMARY OF DATA RELATING TO WASHING EXPERIMENTS

Sample	Bleaching Conditions: Cl Consumed %	Bleaching Conditions: Reaction time min.	pH of Washing	Chemical Analyses of Pulps: Ash %	Lignin %	Alpha-cellulose %	1% NaOH solubility %	Viscosity cp.	Reflectance %	Printing opacity %
Unbleached	...	...	.....	0.95	3.08	86.9	1.56	36.4	35.0	...
2-3.3 (4)	3.8	9	2	0.08	2.83	73.8	18.5	19.3	44.0	98.0
	3.0	3	5.5	0.12	2.11	80.3	10.1	21.2	42.8	96.6
	3.6	10	6.9	0.18	1.60	84.3	5.3	27.6	43.9	97.2
	3.4	6	12	0.34	1.00	84.8	2.7	27.0	46.7	94.7
	3.4	11	1% NaOH	0.15	0.52	85.8	3.5	28.2	49.3	94.7
	3.3	10	1% NaOH 60° C.	0.19	0.39	85.9	3.2	31.5	52.8	94.4
6-3.3 (4)	3.8	22	2	0.08	2.10	73.0	12.2	14.8	50.4	96.1
	3.7	9	5.5	0.25	1.98	83.9	5.4	20.4	51.5	96.2
	3.4	18	6.9	0.31	1.87	84.5	6.1	17.3	53.2	92.9
	3.5	13	12	0.44	0.93	85.1	4.7	23.4	54.1	94.0
	3.4	25	1% NaOH	...	0.56	86.0	3.9	25.6	62.5	92.1
9.5-3.3 (8)	3.6	115	2	0.06	1.50	82.7	6.2	22.2	61.6	91.5
	2.9	113	5.5	0.61	1.74	86.9	3.4	26.7	64.5	90.9
	3.4	77	6.9	0.60	1.62	86.6	4.0	29.7	64.2	90.4
	3.7	113	12	0.64	1.04	86.5	3.9	32.5	66.3	88.6
	3.5	180	1% NaOH	...	0.83	87.4	3.5	34.1	66.3	89.4
2-6.7 (8)	6.6	40	2	0.05	2.02	75.0	23.8	12.5	47.0	96.0
	5.6	27	5.5	0.08	1.23	78.5	12.8	15.9	46.8	96.6
	6.7	39	6.9	0.12	0.76	84.1	5.2	18.7	47.7	95.2
	6.6	48	12	0.29	0.48	85.0	4.9	20.8	51.4	93.0
	6.7	42	1% NaOH	0.30	0.35	86.0	4.3	25.2	54.4	91.4
	6.0	38	1% NaOH 60° C.	0.22	0.22	...	4.4	22.9	58.8	92.5
6-6.7 (8)	7.2	156	2	0.05	0.58	68.2	18.9	5.3	72.9	82.0
	5.8	92	5.5	0.25	0.59	80.8	10.1	9.9	74.0	81.6
	6.4	105	6.9	0.43	0.35	78.5	13.7	6.8	73.8	81.7
	7.3	145	12	0.35	0.37	79.2	...	6.2	75.6	77.9
	6.5	270	1% NaOH	...	0.22	76.7	13.9	6.3	78.6	77.9
9.5-6.7 (8)	6.9	1755	2	0.04	0.06	74.6	11.7	10.6	76.0	82.4
	7.0	1660	5.5	0.51	0.51	86.2	5.4	12.0	78.0	79.5
	7.1	1735	6.9	0.49	0.18	86.2	5.5	12.3	79.2	80.4
	6.9	1710	12	0.53	0.39	86.4	6.4	12.4	78.4	78.9
	6.5	1785	1% NaOH	...	0.25	86.9	6.2	12.5	79.3	77.5

actual chlorination and subsequent reactions. However, the physical phenomena of diffusion and dissolution are of considerable importance in the removal of the potentially soluble lignin from cellulosic fibers. As evidence for this it is apparent that the amount of residual lignin depends very markedly upon the temperature and time of the alkaline washing, as shown in Tables X and XI and Fig. 13.

TABLE X.—EFFECT OF TEMPERATURE OF WASHING

Sample	Temperature of ° C. washing	Chemical Analyses: Lignin	1% NaOH soln.	Viscosity	Reflectance	Printing opacity
Unbleached kraft pulp	..	3.08	1.56	36.4	35.0	...
2-3.3 (4)	23	1.2	3.8	31.9	42.8	98.0
	50	0.76	3.6	33.9	44.5	97.0
	75	0.65	3.4	33.6	46.5	96.0
	100	0.53	2.9	34.5	47.7	95.0

TABLE XI.—EFFECT OF TIME OF WASHING

Sample	Time of washing min.	Chemical Analyses: Lignin	1% NaOH soln.	Viscosity	Reflectance	Printing opacity
2-3.3 (4)	0	1.21	3.9	33.6	42.2	97.0
	10	1.37	4.0	30.6	43.0	98.0
	100	0.98	3.6	30.1	43.5	97.1
	1000	0.81	3.7	30.1	46.2	96.5
	10000	0.60	3.8	29.3	52.6	93.0

These results can be interpreted as indicating that while the chlorination proceeds almost instantly, the dissolution of the chlorinated products into alkali is relatively slow because of the necessity for these products to diffuse through the colloidal fibrous structure of the cellulose. Similar phenomena involving incomplete removal of a partially oxidized product may probably be the reason for the return in color to bleached pulps *(58)*.

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Kalamazoo TAPPI Discusses Patents

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry met at the Park-American Hotel, Kalamazoo, Mich., on Thursday evening December 4. Fred L. Chappell, Jr., of the Sutherland Paper Company presided as Chairman.

The guest speaker was Ralph Chappell of the law firm of Earl and Chappell who talked on "Patents." In this address the inventor's rights and limitations were pointed out. Other subjects discussed included the history of patent law, what can and cannot be patented, and the reasons for issuance of patents.

The next meeting of the Section will be held with the local Superintendents Association division on January 15th. E. W. Tinker, Executive Secretary of the American Paper and Pulp Association will be the speaker. On February 5th V. S. Denison of the Beloit Iron Works will talk on cylinder and fourdrinier board machine operation.

Those present included Ray L. Barton, N. J. Berger, Olin W. Callighan, Fred L. Chappell, Jr., Ralph L. Chappell, Paul de Guehery, W. P. Dohne, F. D. Elliott, D. Robert Erickson, Merton, S. Fogerty, R. D. Freeman, E. R. Hamilton, W. F. Hathaway, R. H. Hurst, W. Kent Kidder, W. A. Kirkpatrick, Merritt Lawrence, Frank Libby, Wm. W. Maclem, Al Perlick, Fred K. Shankweiler, Hugh C. Smith, Homer Stafford, E. B. Taylor, R. M. Upright, Joe Waber, and Arthur Weinland.

Finger Print Huyck Employees

[FROM OUR REGULAR CORRESPONDENT]

RENSSELAER, N. Y., December 8, 1941—The fingerprinting of all employees of F. C. Huyck & Sons was started this week under the direction of the local police department. Approximately 1,100 employees will be fingerprinted within the next two weeks at the request of the Department of Justice and the prints are to be sent to the Federal Bureau of Investigation at Washington. The company is now working on large government contracts for blankets which is believed to have resulted in the request for the prints.

Delaware Valley TAPPI Quiz Meeting

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Philadelphia Engineers Club, Philadelphia, Pa. on Friday, December 5, 1941 with Vice Chairman J. R. Atwater, presiding. The program was a new kind for this TAPPI Section, a quiz with four specialists to answer questions submitted during the month to the Program Committee. The board of specialists consisted of Phil Goldsmith of Pusey & Jones Corp.; P. M. Loddengaard of Bulkley, Dunton Pulp Co.: John Davis of Dill & Collins, Inc.; and C. M. Connor of The Valley Forge Laboratories.

The program was highly amusing but of equal or greater importance was the educational value indicated by the discussion by the experts and by the members from the floor to back up statements. The board's record was 78%.

Some of the questions and the answers submitted by the members were:

1. Name a grade or class of paper having a specific gravity of: (a) 1.25 (ans.—glassine); (b) 0.50 (ans.—blotting); (c) 0.65 (ans.—newsprint); (d) what is the theoretical maximum (ans.—1.54).
2. (a) What new bleaching agent has been developed to bleach "without cellulose degradation?" Ans. Sodium chlorite at low pH.
   (b) What is the advantage of the chloramine process over chlorine for bacteriological treatment? Ans. Chloramine is a weaker oxidation agent and is expended more slowly.
   (c) What effect does starch, as a surface size, have on the growth of microorganisms? Ans. Starch binds the small amounts of water present and decreases rate of bacterial formation.
3. Why is sugar used in flexible glue formulas for adhesives and grease-resistant coatings for paper and paperboard? Ans. Sugar, being an aldehyde, exerts a "tanning" or insolubilizing effect as well as a thickening action that slows penetration, speeds the "set" and hence improves coverage and resultant cost. A permanent softener must of course be used with the sugar—i.e., glycerol or sorbitol because the tanning action of the sugar would otherwise result in total loss of flexibility.
4. (a) Define thixotropy? Ans. The tendency to flow increases with increasing pressures or rates of shear—i.e., the tendency to become less viscous.
   (b) Define dilatancy? Ans. The opposite of thixotropy.
5. (a) What causes buckling and curling of the paper at the coating machines? Ans. Variation in basis weight and density across the sheet of paper.
   (b) What causes blowing and cutting of a sheet of paper in the supercalenders? Ans. Same as (a).
   (c) Can a ridge or welt in the paper coming off the paper machine be taken out in the coating or calender operations? Ans. No. If anything the ridge or welt is more pronounced after the coating, and the ridge or welt is still there after the calendering operation because there is either more or less thickness to the sheet at that spot. Variations of 4 to 8 pounds have been found at a ridge or welt.
6. What is the reason for a cotton roll blowing out in the middle in a short period of operations? Ans. In the manufacture of the roll, the pressing period is not long enough to bring about a uniform density across the face and throughout the roll and when placed in operation the frictional heat causes the roll to blow.
7. What causes a wire to fill up while using the following formula: 25 lb. benzo purpine dye, 100 lb. NaCl, 10 lb. alum and 2 lb. soda ash? (It has been our experience in the past that after two or three hours running we lose our pick up on the Fourdrinier (crepe) machine. On examination we found a slimy substance on the wire.) Ans. The formation of aluminum hydroxide. The problem was solved by dissolving the soda ash in water and then pouring the solution slowly into the beater.
8. There are many kinds of fibers used in pulp and paper manufacturing such as from wood, leaves, stems, and seed-hair. Why are not more of the fibers other than from wood utilized to a greater extent? Ans. In all other fibers the percentage of useful bast fibers is so small that enormous quantities of raw materials would be required to produce enough papermaking fibers. In addition some of these raw materials have difficultly removable noncellulosic constituents.

Among those present were the following: Herbert Ash, Jr., D. E. Bates, M. G. Benson, A. L. M. Bixler, S. W. Blanchard, Alan R. Boyd, S. G. Briscoe, C. M. Connor, J. D. Davis, D. S. Dieffenderfer, J. C. Dieffenderfer, Paul Easton, Jacob Edge, C. E. Elphick, Robert M. Gavin, Philip H. Goldsmith, Jesse F. Good, S. Hagner, A. M. Hardey, H. F. Hoffman, Harry Hulmes, Willard H. Lapp, M. L. Little, Lester Long, G. B. Martin, M. Craig Maxwell, F. J. McAndrews, Louise E. McGrath, Alex. McInnes, Edward C. Molin, Walter B. Morehouse, C. E. Mueller, J. F. Nicholas, Floyd W. Nienow, Walter Quinn, C. H. Rice, C. W. Rivise, W. K. Schlotterbeck, Edw. A. Shallcross, Geo. H. Spencer, Howard H. Street, George M. Suydam, Thomas W. Toovey, J. Waller, Vincent F. Waters, H. E. Waugh, H. L. Winslow, Edmund A. Yerger.

Reservoir Lessens Flood Danger

GLENS FALLS, N. Y., December 8, 1941—Announcement is made here that the 17th annual payment for the construction and maintenance of the Sacandaga Reservoir has been presented to the Warren County Board of Supervisors for approval. Paper mills and industrial concerns along the Sacandaga and Hudson Rivers are among those principally affected by the assessments inasmuch as they are the chief beneficiaries from the huge reservoir which was constructed by the state at an estimated cost of about $12,000,000. The reservoir has already proven of great benefit to mills during drought periods by allowing continuance of operations and the result has been the saving of a considerable amount to the owners. Flood dangers in the Northern New York section have also been virtually eliminated through control of the reservoir.

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard; Bleached Sulphite More Acute—Some Grades of Old Waste Lower.

Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.

NEW YORK IMPORTS

WEEK ENDING DECEMBER 6, 1941

SUMMARY

Cigarette paper .....111 cs.
Paper hangings .....5 bls.
Newsprint .....19,348 rolls, 638 bdls.
Wrapping paper .....499 rolls
Filter paper .....40 cs.
Drawing paper .....8 cs.
Photo paper .....200 cs.
Decalcomania paper .....43 cs.
Tracing cloth .....16 cs.

CIGARETTE PAPER

National City Bank, ——, Cristobal, 1 cs.
Garcia & Diaz, ——, Barcelona, 20 cs.
E. F. Pipe & Co., ——, Barcelona, 90 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., ——, England, 5 bls.

NEWSPRINT

——, ——, Comeau Bay, 7,673 rolls.
Bank of The Manhattan Co., ——, Cornerbrook, 1,851 rolls.
The Bowater Paper Co., Inc., ——, Cornerbrook, 3,330 rols, 638 bdls.
——, ——, Liperpool, N. S., 5,489 rolls.
——, ——, Cornerbrook, 1,005 rolls.

WRAPPING PAPER

J. J. White Paper Co. ——, Cornerbrook, 77 rolls.
Armour & Co., ——, Cornerbrook, 211 rolls.
International Salt Co., Inc., ——, Cornerbrook, 91 rolls.
Robertson Paper Co., Inc., ——, Cornerbrook, 119 rolls.
Coy Hunt & Co., ——, Cornerbrook, 1 roll.

FILTER PAPER

J. E. Bernard & Co., ——, Buenos Aires, 30 cs.
H. Reeve Angel & Co., Inc., ——, England, 10 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., ——, England, 8 cs.

PHOTO PAPER

——, ——, England, 200 cs., (base paper).

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., ——, England, 43 cs., (duplex).

TRACING CLOTH

——, ——, England, 16 cs.

RAGS, BAGGINGS, ETC.

The Bowater Paper Co., Inc., ——, Cornerbrook, 1,890 rolls, 193 bls. waste paper.
A. W. Fenton Co., ——, Buenos Aires, 71 bls. cotton cuttings.
S. Godfrey, ——, Buenos Aires, 44 bls. rags.
——, ——, Santos, 17 bls. waste.
——, ——, Buenos Aires, 200 bls. cellulose.
West Texas Cottonoil Co., ——, Buenos Aires, 300 bls. cotton linters.
——, ——, England, 27 bls. waste paper, 7 bls. paper stock.

OLD ROPE

D. M. Hicks, Inc., ——, Calcutta, 326 bls. old hemp rope.
R. L. Pritchard & Co., ——, Calcutta, 336 bls. old hemp rope cuttings.

CASEIN

C. W. Burckhalter, ——, Buenos Aires, 334 bags.
Trans Atlantic Animal By-Products Corp., ——, Buenos Aires, 250 bags.
National City Bank, ——, Buenos Aires, 960 bags.
H. S. Cramer & Co., Inc., ——, Buenos Aires, 417 bags (ground lactic).
American British Chemical Supplies, ——, Buenos Aires, 417 bags (ground).
H. S. Cramer & Co., Inc., ——, Buenos Aires, 2,585 bags (ground).

GLUESTOCK, ETC.

Darmstadt Scott & Courtney, ——, Buenos Aires, 58 bls. dry gluestock.
Biological Raw Products, Inc., ——, Santos, 62 bags glue in sheets.

WOOD PULP

——, ——, Sheet Harbor, 1,450 bls. ground wood pulp.

Maple Leaf Blankets

At the annual meeting of the National Paperboard Association, held at the Waldorf on November 13, William H. Coverdale, president of The Maple Leaf Fund, addressed the board manufacturers. He thanked them for their generous gift of paper mill felts to Maple Leaf Fund and reported that over 65,000 blankets had been made from their felts and shipped to England, where they had been distributed among needy civilians. This, Mr. Coverdale said, was the largest single gift which had been made by any industrial organization for war relief.

The arrangement between the association and the fund was worked out last year. The mills ship their felts to designated blanket manufacturers and there their responsibility ends. The Maple Leaf Fund provides the money for conversion of the blankets and carries on from there.

After this arrangement was effected many paper mills began shipping their felts on the same basis and at the present over 8,000 blankets a month are going overseas. Up to date not one has been lost.

Full instructions will be sent to any mill which wishes to cooperate in this movement, by writing to the National Paperboard Association, 80 East Jackson Boulevard, Chicago, Ill., or at 40 East 41st Street, New York, or to the Maple Leaf Fund, Inc., 601 Fifth Avenue, New York.

Paper Box Orders Decline

Orders booked last month by members of the Folding Paper Box Association of America declined 17 per cent from October, but remained 30 per cent above November, 1940.

New York Paper and Pulp Market Review

State of War Expected To Seriously Affect Civilian Supply of Sulphite Pulp As Defense Will Need More For Nitrating Pulps — Waste Paper Demand Heavy — Others Steady and Prices Firm.

Office of the PAPER TRADE JOURNAL,
Wednesday, December 10, 1941.

Orders and shipments of paper in the wholesale market continues to be maintained at a record high level. Current reports received from many manufacturers' representatives, jobbers, and general paper merchants, indicate a heavy demand for all leading items.

The index value of manufacturers' inventories for October, reported by the Department of Commerce, total, all industries, was 142.6, compared to 137.8 for September and with 114.4 for October, 1940.

The index value of manufacturers of paper and allied products for October, was 119.0, compared with 117.3 for September, and with 110.3 for October, 1940.

The index value of manufacturers' shipments, total for all industries, for October was 203, compared with 208 for September, and with 146 for October, 1940. The index value for paper and allied products for October was 195, compared with 182 for September, and with 133 for October, 1940.

The declaration of war on the United States by Japan must inevitably result in a tighter control of materials and their allotment for the production of strictly civilian goods. As the OPM declared some time ago, the supplies of linter cotton for the manufacture of explosives is inadequate and highly refined wood pulp will be required for the production of nitrating pulps. Some weeks ago OPM advised a few leading pulp manufacturers to be prepared to produce from 100 daily upward, beginning this month. This tonnage would be increased to several hundred tons per day in 1942. This heavy requirement by the government for wood cellulose will, of course, seriously interfere with the shipments of paper grades of pulp on contract to converting mills. It may be assumed that the tonnage required for defense will be distributed throughout the sulphite pulp industry and that government agencies will endeavor to keep all converting plants in as full operation as practicable. A serious shortage of sulphite pulp is expected to occur next year. This in turn, is expected to result in real and unavoidable hardship for many concerns. It is also expected to usher in a drastic regulation by the government and result in simplification of grades and sizes in paper.

The index of general business activity for the week ended November 29 rose to 133.4%, from 129.8% for the preceding week, compared with 119.3% for the corresponding week last year. Paper board production was 5.8% higher.

Paper production for the week ended November 29 was estimated at 107.5%, compared with 84.4% for 1940, with 97.3% for 1939, with 74.4% for 1938, and with 58.0% for the corresponding week for 1937.

Paper board production for the week ended November 29 was 101.0%, compared with 76.0% for 1940, with 78.0% for 1939, with 57.0% for 1938, and with 50.0% for the corresponding week for 1937.

Current paper prices are well stabilized. The November report of the Department of Commerce just issued, said that paper prices have been singularly stable. Efforts of OPA to prevent price increases and the voluntary agreement of the Northern and Southern kraft producers have been highly successful in preventing fluctuations, although rather substantial gains are reported as compared with a year ago in a number of important types of paper.

Chemical Pulp

Reports this week continue to stress the tight supply situation in unbleached sulphite and the increasing scarcity of all grades of chemical wood pulp. Domestic consumption for September, the Department of Commerce states in its last report, exceeded 113,000 tons and was nearly 70% above last year. Production was up 23.7% above a year ago; shipments up 18.3%; imports 72.5% higher, while exports declined 53.8% and pulp mill stocks were 41.5% lower.

Prices are stabilized and no upward revision from prevailing contract prices are likely to occur. The war with Japan will have an adverse effect on the supply of sulphite pulp for civilian goods. The supply of cotton linters is not sufficient for munition needs and large quantities of sulphite wood pulp will be required for nitrating, thus curtailing the production of paper making grades of pulp. No further information has as yet been released by the Office of Production Management.

Rags

Demand continues good for cotton cuttings and prices are firm and unchanged. No important change in the supply situation has been reported during the current week.

Mill buying is fair to moderately good in roofing rags at this date. Prices continue unchanged.

Old Rope and Bagging

Mill buying continues to absorb about all the limited lots of old Manila rope available. The market is firm and prices are unchanged.

Old Waste Paper

Demand continues heavy for waste paper with more mills reported to be resorting to paper stock because of inability to obtain sufficient supplies of wood pulp. OPA is displaying firmness in its efforts to regulate maximum prices and has been instrumental in obtaining refunds from some jobbers for prices charged in excess of official OPA rates.

Twine

Demand continues active for many grades of hard and soft fiber twines. Prices are firm, with no important changes reported on any grade at this date.

Mr. and Mrs. Adams 50 Years Wed

Mr. and Mrs. A. L. Adams of the A. L. Adams Paper Company, Baldwinsville, Mass., are celebrating their fiftieth wedding anniversary on December 13.

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You are invited to use
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Corn Products Sales Co.
17 BATTERY PLACE
NEW YORK CITY

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An Idea

60 YEARS AHEAD

OF ITS TIME

TODAY, we are hearing a great deal about American self-sufficiency in chemicals.

It is easy to think of this as an idea that is new and different.

As a matter of fact, this concept was the driving force behind the start of a great chemical development fully 60 years ago.

Rowland Hazard and William Cogswell talked of American chemical self-sufficiency in 1881 and with this thought in mind founded The Solvay Process Company.

Because of the foresight of these men, America is today independent in the matter of Alkalies, and because of that fact, enjoys a large measure of chemical self-sufficiency.

At no other period in American history has chemical self-sufficiency been of greater importance than it is at the present time. And yet, there is even more to the story of chemical progress than our national security.

This is the age of research development on many fronts . . . of an endless procession of new things . . . plastics, fabrics, fuels, metals, new types of glass, which are coming from the laboratories.

This is THE NEW WORLD OF CHEMISTRY in which Alkalies are of major importance. It is the world of new materials which took a long stride forward 60 years ago when the foundations of The Solvay Process Company were laid down.

Now, as increasing quantities of pure grades and new forms of alkalies become more important than ever before, it is highly important to check sources of supply for reliability and capacity to meet all contingencies.

The present situation serves only to emphasize the advantages of buying your alkalies from Solvay.

1881 1941

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 Rector Street • New York, N. Y.

★

SOLVAY ALKALIES FOR PULP AND PAPER MAKING

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, December 10, 1941.

BLANC FIXE—Prices on blanc fixe are firm and unchanged and conform to prevailing market levels. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton, f.o.b. works. Demand reported good for the week.

BLEACHING POWDER—Quotations on bleaching powder are firm. Demand reported good for the week. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Prices on casein are firm, under a good demand for the current week. Standard domestic casein, 20-30 mesh, is currently quoted at 30 cents per pound; 80-100 mesh, at 30½ cents per pound. All prices in bags, car lots. Argentina casein, 20-30 mesh, is currently offered at 29 cents per pound. No quotations on French casein.

CAUSTIC SODA—Quotations on caustic soda are firm and continue unchanged at prevailing market prices. Demand reported good. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, car lots, at works.

CHINA CLAY—Prices on china clay are firm and conform to prevailing market levels. Demand reported moderate at this date. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is currently offered at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine are firm and unchanged. Government demand heavier. Market under mandatory priority ruling. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the week with prices lower on some grades. "G" gum rosin is currently quoted at $2.89 per 100 pounds, in barrels. Savannah "FF" wood rosin is currently quoted at $2.89 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $3.12 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand active for the current week. Domestic salt cake is currently quoted at $15 per ton, in bulk; chrome cake at $16 per ton. All prices in car lots, f.o.b., shipping point. The quotation of $16 per ton on imported salt cake is nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market levels. Demand reported active for the week. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are firm and are reported unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported heavy for the current week. The commercial grades are currently quoted at $1.15; iron free at $1.85 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and conform to prevailing market levels. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mines. No quotations on imported talc.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.25	@	$6.00
Superstandard	4.87½	"	5.25
Northern Standard Wrapping	4.50	"	5.00
Standard Wrapping	4.50	"	—
Tissues—Per Ream—Carlots			
White No. 1	1.07½	"	—
White No. 1 M. G.	.97½	"	—
White No. 1½	.85	"	—
White No. 2	.85	"	—
Anti-Tarnish M. G.	.90	"	—
Colored	1.00	"	—
Kraft	.90	"	—
Manila	.80	"	—
Unbl. Toilet, 1 M.	4.14	"	—
Bleached Toilet	5.60	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.35	"	—
Bleached, Jr.	2.65	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.75	@	10.75
No. 1 Manila Wrapping, 35 lb.	5.50	"	5.75
No. 2 Manila Wrapping, 35 lb.	5.25	"	5.50
Boards, per ton—			
News	*45.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Lt. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*60.00	"	—
Binders Boards	*80.00	"	—

* OPA Maximum Prices.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
100% Rag Ext. No. 1	$40.25 @ $47.25		$41.40 @ $48.50
100% Rag	32.20 " 37.75		33.35 " 39.25
85% Rag	.... "		32.20 " 37.75
75% Rag	24.75 " 29.00		25.90 " 30.50
65% Rag	.... "		22.80 " 27.75
50% Rag	18.70 " 22.75		19.90 " 24.25
25% Rag	16.40 " 20.00		17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds		Ledgers
No. 1	$10.55 @ $12.75		$11.70 @ $14.25
No. 2	9.65 " 11.75		10.80 " 13.25
No. 3	9.20 " 11.25		10.35 " 12.50
No. 4	8.90 " 10.75		10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. & S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. & S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—	
Moist	No prices
Dry	No prices

(Delivered)

No. 1 Domestic and Canadian	40.00	@	42.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.62½	@	4.75
Prime Qualities—			
Easy-Bleaching Sulphite	3.17½	"	4.25
Strong Unbleached Sulphite	3.17½	"	4.25
News Grade, delivered			
Unbleached Sulphite	63.75	"	67.75

(On Dock, Atlantic Ports)

Kraft Bleached	4.12½	"	—
Kraft Light & Strong	No price		
Kraft No. 1	No prices		

(Delivered)

Kraft Domestic and Canadian	3.00	"	4.00

(Delivered)

Soda Bleached	3.30	"	—

Add 60 cents per short ton, does charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	8.00	@	8.25
Silesias No. 1	4.50	"	4.75
New Unbleached	8.00	"	8.25
Blue Overall	5.75	"	6.00
Fancy	3.00	"	3.25
Washables	2.50	"	2.75
Mixed Khaki Cuttings	2.50	"	2.75
O. D. Khaki Cutings	3.00	"	3.15

Old Rags

White, No. 1—			
Repacked	3.75	"	4.00
Miscellaneous	3.25	"	3.50
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Third and Blues—			
Repacked	1.25	"	1.35
Miscellaneous	1.10	"	1.25
Roofing Rags—			
No. 1	1.50	"	1.60
No. 2	1.35	"	1.50
No. 3 (bagging)	.95	"	1.00
No. 4	.90	"	.95
No. 5A	.90	"	.95

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

THE challenge of the War Department finds one answer in the words of Edward Bausch when he says, "My associates and myself have obligated this company to a program that eclipses in magnitude and speed all previous efforts."

This pledge is underlined and italicized three times every twenty-four hours by the long lines of workers in each change of shift. Every resource and facility gained in filling the diverse optical needs of education, research and industry is being concentrated in maintaining an unbroken flow of optical instruments to America's front lines of defense and to America's defense industries.

Many are the Bausch & Lomb products that help to "keep 'em flying." There are bubble octants for aerial navigation; photo lenses for mapping and reconnaissance, height finders, searchlight mirrors and flank-spotting scopes for anti-aircraft defense; binoculars for spotters; Ray-Ban Glasses for fliers.

The accepted optical aids to industry developed by Bausch & Lomb—the Contour Measuring Projector, the Metallographic Equipment, the B&L Littrow Spectrograph—are now in the first line of production, doing important work in keeping them flying.

BAUSCH & LOMB

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Established 1853

AN AMERICAN SCIENTIFIC INSTITUTION PRODUCING OPTICAL GLASS AND INSTRUMENTS FOR NATIONAL DEFENSE, EDUCATION, RESEARCH, INDUSTRY AND EYESIGHT CORRECTION

Whenever you have

JOB LOTS—SECONDS—SIDE RUNS for disposal

It will be to your advantage to contact us

—because we have DOMESTIC and EXPORT OUTLETS.

—because we can take any QUANTITY, however large.

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Pure TiO_2

This grade of TiO_2 shows highest developments of aqueous dispersion and suspension yet attained.

General Preference Order M-44 will govern our distribution of Zopaque beginning January 1, 1942.

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MACHINES FOR THE PAPER MILL

THE HEART OF THE PAPER MILL

THREE PLUNGER STUFF PUMP

A Pump that can take it — straight flow through easily reached bronze ball valves in reversible seats — motor or pulley drive.

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FAN PUMPS FOR WHITE WATER

"RAINSTORM" Shower Pipes

The "UNDERCUT" Trimmer

PLATEN DIE PRESSES

BUILDERS OF: Fourdrinier and Cylinder Paper Machinery—Wet and Bindersboard Machines—Jordans—Rotary Cutters with automatic spot cutting control—Paper Bag Machinery.

THE SMITH & WINCHESTER

Manufacturing Company

SOUTH WINDHAM ★ CONNECTICUT

No. 1 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens.	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.00	@	4.25
Wool Tares, light....	4.25	"	4.50
Wool Tares heavy..	4.50	"	4.75
Bright Bagging.....	3.50	"	3.75
Manila Rope			
Foreign	6.50	"	6.75
Domestic	6.50	"	6.75
Jute Threads.....	4.00	"	4.25
Sisal Strings.....	2.75	"	3.00
Mixed Strings.....	1.10	"	1.20

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard Colored Envelope Cuts.	3.12½	"	—
No. 1 Hard White Shavings, unruled.	2.87½	"	—
No. 1 Hard White Shavings, ruled...	2.50	"	—
Soft White Shavings, one cut.....	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings..	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines.....	1.57	"	—
Mixed Books.....	1.07½	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut..	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas.....	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft.	2.50	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Old Kraft Corrugated Containers	1.35	"	—
New Corrugated Cuttings	.90	"	—
Old Corrugated Containers	.82½	"	—
Box Board Cuttings.	.72½	"	—
White Blank News.	1.65	"	—
Overissue News.....	.85	"	—
No. 1 Baled News..	.75	"	—
Super Mixed Paper..	.70	"	—
No. 1 Mixed Paper.	.65	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp.....	.21	"	—
Fine Polished—			
Fine India.....	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers.....	.17	"	—
Tube Rope.....	.19	"	—
Wall Paper.....	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope...	.19	"	—
Cotton	.25	"	—
(Hard Fiber)			
Medium Java.....	.18	"	—
Mex. Sisal.....	.16	"	—
Manila	.26	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White No. 2.	.04½	"	.05
Light Silesias.....	.04½	"	.04¾
Silesias, No. 1....	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached..	.07¼	"	.07½
Washable Prints...	.03¼	"	.03½
Washable No. 1..	.02	"	.02¼
Blue Overall.....	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales....	.03¼	"	.03½
New Black Soft...	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.....	.03	"	.03¼
No. 2 Mixed.....	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas.....	.04¾	"	.05¼
New Black Mixed.	—	"	.02½

Domestic Rags (Old)

White No. 1—			
Repacked	3.25	@	3.75
Miscellaneous	3.00	"	3.25
Thirds and Blues—			
Miscellaneous	2.00	"	2.25
Repacked	2.25	"	2.50
Black Stockings (Export)	Nominal		
Roofing Stock—			
Foreign No. 1....	Nominal		
Domestic No. 1...	1.95	"	2.00
Domestic No. 2...	1.80	"	1.85
Roofing Bagging..	1.70	"	1.75

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Manila Rope.....	5.00	"	5.50
Sisal Rope.....	3.75	"	—
Mixed Rope.....	.75	"	1.00
Scrap—			
No. 1.....	3.75	"	4.00
No. 2.....	1.75	"	1.80
Wool Tares, heavy...	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled.	2.87½	"	—
Soft White Shavings, one cut.....	2.87½	"	—
White Blank News..	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger.	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines.....	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper.	.65	"	—
Super Mixed Paper..	.70	"	—
Box Board Cuttings.	.72½	"	—
New Corrugated Cuttings	.90	"	—
Overissue News.....	.85	"	—
No. 1 Baled News...	.75	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled.	2.87½	"	—
No. 1 Hard White Shavings, ruled...	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut.....	2.87½	"	—
Hard White Envelope Cuts, one cut.....	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft.	2.50	"	—
Mixed Kraft Env. & Bag Cuttings.....	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines.....	1.57	"	—
New Manila Envelope Cuts, one cut.....	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News..	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper.	.65	"	—
Super Mixed Paper.	.70	"	—
Overissue News.....	.85	"	—
Box Board Cuttings.	.72½	"	—
Old Kraft Corrugated Containers	1.35	"	—
Old Corrugated Containers	.82½	"	—
New Corrugated Cuttings	.90	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	4.50	@	4.75
Sisal Rope.....	4.00	"	4.25
Mixed Rope.....	1.00	"	1.25
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Soft Jute Rope.....	5.00	"	5.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.50	@	6.75
Jute Carpet Threads.	3.00	"	3.25
Bleachery Burlap....	7.50	"	8.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	6.50	"	6.75
Scrap Sisal.....	3.25	"	3.50
Scrap Sisal for Shredding	4.00	"	4.25
Wool Tares—			
Foreign	(nominal)		
Domestic	3.00	"	5.50
Aust. Wool Pouches.	5.25	"	5.50
New Burlap Cuttings	5.75	"	6.00
Heavy baling bagging	4.75	"	5.00
Paper Mill Bagging..	3.25	"	3.50
No. 2 Bagging.....	.50	"	.60

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints.	.04½	@	.04¾
Fancy Percales...	.04¼	"	.05
New White No. 1.	.07¾	"	.08
New Light Flannelettes	.06	"	.06¼
Canton Flannel, Bleached	.08¾	"	.08½
Underwear Cutters, Bleached	.08½	"	.08¾
Silesias No. 1.....	.04½	"	.05
New Black Silesias..	.04½	"	.04½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached....	.08½	"	.08¾
Blue Cheviots....	.04¾	"	.05
Fancy	.01¾	"	.02
Washable	.01¾	"	—
Cottons—According to Grades			
Blue Overalls.....	.06	"	.06¼
New Black, Soft..	.03¾	"	.04
Khaki Cuttings.....	.02¼	"	.02½
O. D. Khaki.....	.02½	"	.03¼
Corduroy	.02	"	.02¼
New Canvas.....	.05½	"	—
B. V. D. Cuttings...	.07¾	"	.08

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	4.00	@	—
Miscellaneous	3.00	"	—
White No. 2—			
Miscellaneous	2.50	"	3.00
Twos and Blues.....	1.75	"	2.00
Old Blue Overalls...	2.25	"	2.50
Thirds and Blues....	1.75	"	—
Miscellaneous	1.25	"	1.35
Black Stockings.....	3.50	"	4.00
Roofing Stock—			
No. 1.....	1.80	"	—
No. 2.....	1.60	"	—
No. 3.....	1.50	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons.....	(nominal)
Dutch Blues.....	(nominal)
New Checks and Blues	(nominal)
Old Fustians.....	(nominal)
Old Linsey Garments.	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled.	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines.....	1.57	"	—
White Blank News..	1.65	"	—
Mixed Kraft Env. & Bag Cuttings..	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News.....	.85	"	—
No. 1 Baled News..	.75	"	—
No. 1 Mixed Paper..	.65	"	—

Gummed Industries Elect Officers

The following officers were elected at the annual convention of the Gummed Industries Association held recently at the Hotel Carter, Cleveland, Ohio:—F. A. Stocker, Atlantic Gummer Paper Corp., Brooklyn, N. Y., re-elected president; Roth Herrlinger, Gummed Products Company, Troy, Ohio, elected vice-president; Philip O. Deitsch, Gummed Industries Association, 19 W. 44th street, New York, N. Y., re-elected secretary-treasurer.

Elected to the board of directors, were: James R. Carter, Nashua Gummed & Coated Paper Co., Nashua, N. H.; W. K. Gerbrick, Central Paper Company, Menasha, Wisconsin; A. S. Hammond, Western Waxed Paper Co., North Portland, Oregon: Frank A. O'Neill Jr., Paper Manufacturers Co. Inc., Philadelphia, Pa.; R. S. Rowlett, McLaurin-Jones Co., Brookfield, Mass.